UNITED STATES
SECURITIES AND EXCHANGE COMMISSION

Washington, D.C. 20549

FORM 10-K

(Mark One)

☒ **ANNUAL REPORT PURSUANT TO SECTION 13 OR 15(d) OF THE SECURITIES EXCHANGE ACT OF 1934**

For the fiscal year ended December 31, 2021

OR

☐ **TRANSITION REPORT PURSUANT TO SECTION 13 OR 15(d) OF THE SECURITIES EXCHANGE ACT OF 1934**

For the transition period from to

Commission File Number 001-38841

Precision BioSciences, Inc.

(Exact name of registrant as specified in its charter)

Delaware	**20-4206017**
(State or other jurisdiction of incorporation or organization)	**(I.R.S. Employer Identification No.)**
302 East Pettigrew St., Suite A-100 Durham, North Carolina	**27701**
(Address of principal executive offices)	**(Zip Code)**

Registrant's telephone number, including area code: (919) 314-5512

Securities registered pursuant to Section 12(b) of the Act:

Title of each class	Trading Symbol(s)	Name of each exchange on which registered
Common Stock, par value $0.000005 per share	DTIL	The Nasdaq Global Select Market

Securities registered pursuant to Section 12(g) of the Act: None

Indicate by check mark if the registrant is a well-known seasoned issuer, as defined in Rule 405 of the Securities Act. YES ☐ NO ☒

Indicate by check mark if the registrant is not required to file reports pursuant to Section 13 or 15(d) of the Act. YES ☐ NO ☒

Indicate by check mark whether the registrant: (1) has filed all reports required to be filed by Section 13 or 15(d) of the Securities Exchange Act of 1934 during the preceding 12 months (or for such shorter period that the Registrant was required to file such reports), and (2) has been subject to such filing requirements for the past 90 days. YES ☒ NO ☐

Indicate by check mark whether the Registrant has submitted electronically every Interactive Data File required to be submitted pursuant to Rule 405 of Regulation S-T (§232.405 of this chapter) during the preceding 12 months (or for such shorter period that the Registrant was required to submit such files). YES ☒ NO ☐

Indicate by check mark whether the registrant is a large accelerated filer, an accelerated filer, a non-accelerated filer, a smaller reporting company, or an emerging growth company. See the definitions of "large accelerated filer," "accelerated filer," "smaller reporting company," and "emerging growth company" in Rule 12b-2 of the Exchange Act.

Large accelerated filer	☐	Accelerated filer	☒
Non-accelerated filer	☐	Smaller reporting company	☐
		Emerging growth company	☒

If an emerging growth company, indicate by check mark if the registrant has elected not to use the extended transition period for complying with any new or revised financial accounting standards provided pursuant to Section 13(a) of the Exchange Act. ☐

Indicate by check mark whether the registrant has filed a report on and attestation to its management's assessment of the effectiveness of its internal control over financial reporting under Section 404(b) of the Sarbanes-Oxley Act (15 U.S.C. 7262(b)) by the registered public accounting firm that prepared or issued its audit report. YES ☐ NO ☒

Indicate by check mark whether the Registrant is a shell company (as defined in Rule 12b-2 of the Act). YES ☐ NO ☒

The aggregate market value of the voting and non-voting common equity held by non-affiliates of the Registrant, based on the closing price of the shares of common stock on The Nasdaq Global Select Market on June 30, 2021, was $663.5 million.

The number of shares of Registrant's common stock outstanding as of March 8, 2022 was 61,038,270.

DOCUMENTS INCORPORATED BY REFERENCE

None.

Auditor Firm Id:	34	Auditor Name:	Deloitte & Touche LLP	Auditor Location:	Raleigh, North Carolina

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FORWARD-LOOKING STATEMENTS

This Annual Report on Form 10-K contains forward-looking statements within the meaning of the Private Securities Litigation Reform Act of 1995. We intend such forward-looking statements to be covered by the safe harbor provisions for forward-looking statements contained in Section 27A of the Securities Act of 1933, as amended (the "Securities Act") and Section 21E of the Securities Exchange Act of 1934, as amended (the "Exchange Act"). All statements other than statements of present and historical facts contained in this Annual Report on Form 10-K, including without limitation, statements regarding our future results of operations and financial position, business strategy and approach, including related results, prospective products, planned preclinical studies and clinical trials, or discontinuance thereof, the status and results of our preclinical and clinical studies, including, the potential of our product candidates, if approved, to become best-in-class or first-in-class, expected release of interim data, expectations regarding our allogeneic chimeric antigen receptor T cell immunotherapy product candidates, expectations regarding the use and effects of ARCUS, including in connection with *in vivo* genome editing, potential new partnerships or alternative opportunities for our product candidates, capabilities of our manufacturing facility, potential new application filings and regulatory approvals, research and development costs, timing, expected results and likelihood of success, plans and objectives of management for future operations, as well as the impact of the COVID-19 pandemic and variants thereof may be forward-looking statements. Without limiting the foregoing, in some cases, you can identify forward-looking statements by terms such as "aim," "may," "will," "should," "expect," "exploring," "plan," "anticipate," "could," "intend," "target," "project," "contemplate," "believe," "estimate," "predict," "potential," "seeks," or "continue" or the negative of these terms or other similar expressions, although not all forward-looking statements contain these words. No forward-looking statement is a guarantee of future results, performance, or achievements, and one should avoid placing undue reliance on such statements.

Forward-looking statements are based on our management's beliefs and assumptions and on information currently available to us. Such beliefs and assumptions may or may not prove to be correct. Additionally, such forward-looking statements are subject to a number of known and unknown risks, uncertainties and assumptions, and actual results may differ materially from those expressed or implied in the forward-looking statements due to various factors, including, but not limited to, those identified in Part I. Item 1A. "Risk Factors" and Part II. Item 7. "Management's Discussion and Analysis of Financial Condition and Results of Operations." These risks and uncertainties include, but are not limited to:

- our ability to become profitable;
- our ability to procure sufficient funding and requirements under our current debt instruments and effects of restrictions thereunder;
- risks associated with raising additional capital;
- our operating expenses and our ability to predict what those expenses will be;
- our limited operating history;
- the success of our programs and product candidates in which we expend our resources;
- our dependence on our ARCUS technology;
- the risk that other genome-editing technologies may provide significant advantages over our ARCUS technology;
- the initiation, cost, timing, progress, achievement of milestones and results of research and development activities and preclinical and clinical studies;
- public perception about genome editing technology and its applications;
- competition in the genome editing, biopharmaceutical, and biotechnology fields;
- our or our collaborators' ability to identify, develop and commercialize product candidates;
- pending and potential liability lawsuits and penalties against us or our collaborators related to our technology and our product candidates;
- the U.S. and foreign regulatory landscape applicable to our and our collaborators' development of product candidates;
- our or our collaborators' ability to obtain and maintain regulatory approval of our product candidates, and any related restrictions, limitations and/or warnings in the label of an approved product candidate;

- our or our collaborators' ability to advance product candidates into, and successfully design, implement and complete, clinical trials;
- potential manufacturing problems associated with the development or commercialization of any of our product candidates;
- our ability to obtain an adequate supply of T cells from qualified donors;
- our ability to achieve our anticipated operating efficiencies at our manufacturing facility;
- delays or difficulties in our and our collaborators' ability to enroll patients;
- changes in interim "top-line" data that we announce or publish;
- if our product candidates do not work as intended or cause undesirable side effects;
- risks associated with applicable healthcare, data privacy and security regulations and our compliance therewith;
- the rate and degree of market acceptance of any of our product candidates;
- the success of our existing collaboration agreements and our ability to enter into new collaboration arrangements;
- our current and future relationships with third parties including suppliers and manufacturers;
- our ability to obtain and maintain intellectual property protection for our technology and any of our product candidates;
- potential litigation relating to infringement or misappropriation of intellectual property rights;
- our ability to effectively manage the growth of our operations;
- our ability to attract, retain, and motivate key scientific and management personnel;
- market and economic conditions;
- effects of system failures and security breaches;
- effects of natural and manmade disasters, public health emergencies and other natural catastrophic events;
- effects of the COVID-19 pandemic and variants thereof, or any pandemic, epidemic, or outbreak of an infectious disease;
- insurance expenses and exposure to uninsured liabilities;
- effects of tax rules; and
- risks related to ownership of our common stock, including fluctuations in our stock price.

Moreover, we operate in an evolving environment. New risk factors and uncertainties may emerge from time to time, and it is not possible for management to predict all risk factors and uncertainties.

You should read this Annual Report on Form 10-K and the documents that we reference herein completely and with the understanding that our actual future results may be materially different from what we expect. We qualify all of our forward-looking statements by these cautionary statements. All forward-looking statements contained herein speak only as of the date of this Annual Report on Form 10-K. Except as required by applicable law, we do not plan to publicly update or revise any forward-looking statements contained herein, whether as a result of any new information, future events, changed circumstances or otherwise.

As used in this Annual Report on Form 10-K, unless otherwise stated or the context requires otherwise, references to "Precision," the "Company," "we," "us," and "our," refer to Precision BioSciences, Inc. and its subsidiaries on a consolidated basis.

RISK FACTOR SUMMARY

Our business is subject to numerous risks and uncertainties, including those described in Part I. Item 1A. “Risk Factors” in this Annual Report on Form 10-K. You should carefully consider these risks and uncertainties when investing in our common stock. Some of the principal risks and uncertainties include the following.

- *We have incurred significant operating losses since our inception and expect to continue to incur losses for the foreseeable future. We have not been profitable and may not achieve or maintain profitability.*
- *We will need substantial additional funding, and if we are unable to raise a sufficient amount of capital when needed on acceptable terms, or at all, we may be forced to delay, reduce or eliminate some or all of our research programs, product development activities and commercialization efforts.*
- *We have a limited operating history, which makes it difficult to evaluate our current business and future prospects and may increase the risk of your investment.*
- *ARCUS is a novel technology, making it difficult to predict the time, cost and potential success of product candidate development. We have not yet been able to assess the safety and efficacy of most of our product candidates in humans and have only limited safety and efficacy information in humans to date regarding three of our product candidates.*
- *We are heavily dependent on the successful development and translation of ARCUS, and due to the early stages of our product development operations, we cannot give any assurance that any product candidates will be successfully developed and commercialized.*
- *Adverse public perception of genome editing may negatively impact the developmental progress or commercial success of products that we develop alone or with collaborators.*
- *We face significant competition in industries experiencing rapid technological change, and there is a possibility that our competitors may achieve regulatory approval before us or develop product candidates or treatments that are safer or more effective than ours, which may harm our financial condition and our ability to successfully market or commercialize any of our product candidates.*
- *Our future profitability, if any, will depend in part on our ability and the ability of our collaborators to commercialize any products that we or our collaborators may develop in markets throughout the world. Commercialization of products in various markets could subject us to risks and uncertainties.*
- *Product liability lawsuits against us could cause us to incur substantial liabilities and could limit commercialization of any products that we develop alone or with collaborators.*
- *The regulatory landscape that will apply to development of therapeutic product candidates by us or our collaborators is rigorous, complex, uncertain and subject to change, which could result in delays or termination of development of such product candidates or unexpected costs in obtaining regulatory approvals.*
- *Clinical trials are difficult to design and implement, expensive, time-consuming and involve an uncertain outcome, and the inability to successfully and timely conduct clinical trials and obtain regulatory approval for our product candidates would substantially harm our business.*
- *Any product candidates that we or our collaborators may develop will be novel and may be complex and difficult to manufacture, and if we experience manufacturing problems, it could result in delays in development and commercialization of such product candidates or otherwise harm our business.*
- *Even if we obtain regulatory approval for any products that we develop alone or with collaborators, such products will remain subject to ongoing regulatory requirements, which may result in significant additional expense.*
- *Even if any product we develop alone or with collaborators receives marketing approval, such product may fail to achieve the degree of market acceptance by physicians, patients, healthcare payors and others in the medical community necessary for commercial success.*
- *The ongoing novel coronavirus disease, COVID-19 has impacted, and may continue to impact, our business, and any other pandemic, epidemic or outbreak of an infectious disease may materially and adversely impact our business, including our preclinical studies and clinical trials.*

PART I

Item 1. Business.

We are a clinical stage gene editing company dedicated to improving life by developing *ex vivo* allogeneic CAR T immunotherapies and *in vivo* therapies for genetic and infectious diseases with the application of our wholly owned proprietary ARCUS genome editing platform. The foundation of ARCUS is a natural homing endonuclease which allows us to replicate precise gene editing as it evolved in nature. ARCUS is designed to be precise in its specificity and versatile in its design for gene knock out as well as complex edits with gene insertion and gene repair. ARCUS is also unique in its relatively small size which potentially allows delivery to a wider range of cells and tissues using viral and non-viral gene delivery methods.

We believe our chimeric antigen receptor ("CAR") T cells are the only allogeneic CAR T cells in human clinical trials made with a single gene editing step designed to specifically avoid the potentially deleterious effects of making multiple edits to T cells (as defined below). We are simultaneously conducting a Phase 1/2a clinical trial evaluating PBCAR0191 as a potential first-in-class and a Phase 1 clinical trial evaluating PBCAR19B as, if approved, a potential best-in-class CD19-targeting CAR T cell therapies in adult patients with relapsed or refractory ("R/R"), B-cell malignancies.

Made from donor-derived T cells modified using our ARCUS genome editing technology, PBCAR0191 recognizes the well characterized tumor cell surface protein CD19, an important and validated target in several B-cell cancers. PBCAR0191 is designed to avoid graft-versus-host disease ("GvHD"), a significant complication associated with donor-derived, cell-based therapies. We presented updated data from the PBCAR0191 study utilizing an enhanced lymphodepletion regimen in December 2021 at the 63rd American Society of Hematology ("ASH") Annual Meeting.

PBCAR19B is a novel immune-evading stealth cell candidate employing a single-gene edit in an effort to knock-down beta-2 microglobulin ("β2m") designed for evading T cell rejection, while also inserting a human leukocyte antigen E ("HLA-E") transgene to further evade rejection from natural killer cells. We initiated a clinical trial of PBCAR19B in patients with R/R non-Hodgkin lymphoma ("NHL") in mid-2021 and completed dosing at Dose Level one. We plan to commence dosing at the next dose level with clinical trial material from an optimized manufacturing process once released and expect to provide a program update in mid-2022.

In January 2021, we closed a development and license agreement with Eli Lilly and Company ("Lilly") to discover and develop *in vivo* gene editing product candidates incorporating our ARCUS nucleases. Lilly has initially nominated Duchenne muscular dystrophy ("DMD"), a genetic disease affecting the muscles. Lilly has also nominated a liver-directed target and a central nervous system ("CNS") directed target and has the right to nominate up to three additional gene targets over the first four years of the agreement. We will be responsible for conducting certain pre-clinical research and IND-enabling activities with respect to such gene targets.

In April 2021, we entered into a program purchase agreement (the "Program Purchase Agreement") with Les Laboratoires Servier ("Servier"), pursuant to which we reacquired all of our global development and commercialization rights previously granted to Servier pursuant to a development and commercial license agreement (as amended, the "Servier Agreement"), and mutually terminated the Servier Agreement. This includes our two clinical stage CD19-targeting allogeneic CAR T candidates, PBCAR0191 and PBCAR19B stealth cell, as well as four additional product targets.

In August 2021, we entered into a development and license agreement with iECURE, a mutation-agnostic *in vivo* gene editing company striving to cure devastating diseases with high unmet need, under which iECURE plans to advance our PBGENE-PCSK9 candidate through preclinical activities as well as a Phase 1 clinical trial for the treatment of familial hypercholesterolemia ("FH") as partial consideration for a license to our PCSK9-directed ARCUS nuclease to develop gene-insertion therapies for four other rare genetic diseases, including ornithine transcarbamylase ("OTC") deficiency, Citrullinemia Type 1, phenylketonuria ("PKU"), and another program focused on liver disease. We retain rights to PBGENE-PCSK9, including all products developed for genetic indications with increased risk of severe cardiovascular events such as FH.

In September 2021, we entered into an exclusive license agreement (the "Tiziana Agreement") with Tiziana Life Sciences ("Tiziana") to evaluate foralumab, a fully human anti-CD3 monoclonal antibody ("mAb"), as a lymphodepleting agent in conjunction with our allogeneic CAR T cells for the potential treatment of cancers. This agreement reflects our ongoing pursuit of a potential best-in-class allogeneic CAR T cell therapy.

In November 2021, we announced that we will not continue development of PBCAR20A based on data observed to date in a heterogeneous R/R NHL population previously treated with anti-CD20 monoclonal antibodies, as treatment with PBCAR20A did not result in compelling response rates in a Phase 1/2a clinical study. While this study provided important information regarding allogeneic CAR T dosing and lymphodepletion regimens, we intend to focus our clinical efforts in R/R lymphoma on CD19 targeting programs, as we believe CD19 is a more robust antigenic target in R/R heterogeneous NHL populations. All subjects enrolled in the study and evaluated for treatment with PBCAR20A had acceptable tolerability with no GvHD, no Grade ≥ 3 cytokine release syndrome, and no Grade ≥ 3 neurotoxicity.

In December 2021, we announced that we entered into an agreement with a syndicate of investors led by ACCELR8 to separate our wholly owned Elo Life Systems subsidiary (the "Elo Transaction") and create an independent food and agriculture business ("New Elo"). The transaction enables us to focus exclusively on human therapeutics.

Looking ahead to the remainder of 2022 and beyond, we aim to further evaluate ARCUS clinically with the goal of positively impacting human health. In mid-2022, we plan to provide updates on PBCAR0191, PBCAR19B, and PBCAR269A, our allogeneic CAR T therapy product candidate designed to target B-cell maturation antigen ("BCMA") for the treatment of R/R multiple myeloma in combination with nirogacestat, a gamma secretase inhibitor ("GSI") developed by SpringWorks Therapeutics ("SpringWorks"). In the *in vivo* gene editing pipeline, we expect to submit three Investigational New Drug applications ("INDs") or Clinical Trial Applications ("CTAs") in the next three years, including trials to evaluate: PBGENE-PCSK9 for the treatment of FH, PBGENE-PH1 for the treatment of primary hyperoxaluria type 1 ("PH1") and PBGENE-HBV for the treatment of chronic hepatitis B virus ("HBV").

Our Pipeline

***Ex vivo* Allogeneic CAR T Immunotherapy**

Cancer immunotherapy is a type of cancer treatment that uses the body's immune system to fight the disease. CAR T is a form of immunotherapy in which a specific type of immune cell, called a "T cell", is genetically engineered to recognize and kill cancer cells. Current commercially available CAR T therapies are autologous, meaning the T cells used as the starting material for this engineering process are derived directly from the patient. As a consequence, the therapy is highly personalized, difficult to scale, and expensive. Because of the patient's illness, their cells may also not be suitable starting material for manufacturing. Our allogeneic approach uses donor-derived T cells with a single gene edit using ARCUS and are designed for safe delivery to patients with certain cancers. We believe that this donor-derived approach will allow us to consistently produce a potent product by selecting donors with high quality T cells and will lessen the product-to-product variability seen in autologous therapies. We are able to produce allogeneic CAR T cells at a larger scale in a cost-effective manner and have the potential to overcome the "one patient: one product" burden of autologous CAR T cell therapies.

Leveraging the unique gene editing capabilities of ARCUS, we have developed a one-step cell engineering process for allogeneic CAR T cells that is designed to maintain naïve and central memory T cell phenotypes throughout the CAR T manufacturing process, which we believe to be important for an optimized CAR T therapy. We believe our CAR T cells are the only allogeneic CAR T cells in human clinical trials made with a single gene editing step to specifically avoid the potentially deleterious effects of making multiple edits to T cells.

With our decision early in the development of our *ex vivo* platform to invest in process development, we continue to scale and improve our manufacturing process and are currently producing allogeneic CAR T cells at large scale for clinical trials in accordance with current good manufacturing practice ("cGMP").

PBCAR0191. We are conducting our Phase 1/2a clinical trial of PBCAR0191 in adult patients with R/R NHL or R/R B-cell precursor acute lymphoblastic leukemia ("B-ALL"). Currently, we are pursuing a potential first-in-class allogeneic CAR T strategy with PBCAR0191 in patients with lymphoma. The FDA has granted PBCAR0191 orphan drug designation for the treatment of acute lymphoblastic leukemia ("ALL") and Fast Track Designation for treatment of B-ALL.

Updated Data from Phase 1/2a Trial of PBCAR0191 in R/R NHL and R/R B-ALL

In December 2021, we reported updated data from the PBCAR0191 clinical trial utilizing an enhanced lymphodepletion ("eLD") regimen of fludarabine (30 mg/m^2/day × 4 days) and cyclophosphamide (1000 mg/m^2/day × 3 days) targeting CD19 for the treatment of R/R NHL or R/R B-ALL, which included 22 (17 NHL, 5 B-ALL) heavily pre-treated R/R subjects with predominantly advanced or aggressive B-cell malignancies who were evaluable as of November 16, 2021. Evaluable subjects received a median 5 lines of prior treatment, including 27% (6/22) who previously received a CD19-directed autologous CAR T.

For patients that received treatment of PBCAR0191 following eLD as of November 16, 2021:

- PBCAR0191 showed no ≥ Grade 3 cytokine release syndrome (“CRS”), one Grade 3 immune effector cell-associated neurotoxicity syndrome (“ICANS”) with resolution to ≤ Grade 2 in 72 hours, no evidence of graft-versus-host disease, and one infectious death at Day 54 deemed possibly related to treatment
- PBCAR0191 yielded an overall response rate (“ORR”) of 73% and a complete response rate (“CR”) of 59% using a 3 x 10^6 cells/kg cell dose
- Four responders among the 17 evaluable NHL subjects reached Day 180 durability assessment

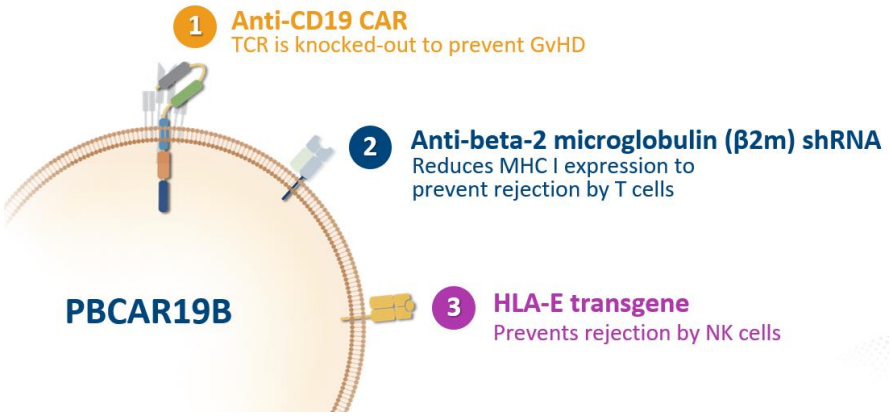
Most notably, a potential signal for PBCAR0191 was observed among six subjects who relapsed after previously receiving an autologous CAR T:

- These subjects experienced an ORR of 100% and a CR of 66% at ≥ Day 28
- More than half of these subjects had a longer duration of response on PBCAR0191 than with the prior autologous CAR T treatment

Currently, there are no FDA approved therapeutics for lymphoma patients who have relapsed following autologous CAR T therapy. PBCAR0191 has the potential to be developed as a salvage treatment for this growing population with high unmet need. We are actively enrolling additional NHL patients in this relapse setting to further evaluate this observed activity.

In parallel to our development of PBCAR0191, we are also working towards developing a candidate with an allogeneic CAR T profile that has the potential to displace CD19 directed autologous CAR T with unique attributes of ARCUS, which is designed to make complex gene edits in a single step with a single dose, potentially reducing translocation safety concerns. We have developed a second-generation “stealth cell” CAR T construct, which we believe has the potential to overcome certain limitations of rejection of allogeneic CAR T cells by the patient’s immune system. Rejection of allogeneic CAR T cells could limit the efficacy of a CAR T therapy if the cells do not persist long enough in the patient to eradicate the tumor.

PBCAR19B. PBCAR19B is an anti-CD19 CAR T candidate built on the stealth cell platform utilizing a single-step gene edit in an effort to minimize the risk of chromosome abnormalities. The stealth cell differs from the first-generation CAR Ts in that it has two additional modifications aimed at avoiding rejection. The stealth cell technology is a modified CAR T vector that is designed to suppress expression of a gene called β2m, in CAR T cells using a short-hairpin RNA, or shRNA, and enable expression of a transgenic HLA-E molecule on the cell surface. β2m is a component of the major histocompatibility complex type 1 (“MHC-I”), a cell surface receptor which enables alloreactive T cell recognition and activation. Suppression of β2m expression leads to reduced cell-surface expression of major histocompatibility complex components HLA-A, HLA-B, and HLA-C. In preclinical studies, we and others have observed that suppression or elimination of β2m reduces the rejection of CAR T cells by alloreactive T cells from an unrelated individual. However, we have found that reduction of cell-surface HLA-A, HLA-B, and HLA-C expression provokes rejection of the CAR T cells by NK cells. Decreased expression of HLA-A, HLA-B, and HLA-C therefore necessitates an additional modification to enable overexpression of HLA-E, a non-classical MHC-I that inhibits cytotoxic killing by NK cells by interacting with inhibitory receptors on the NK cell surface (Gornalusse et al, 2017; Lanza et al, 2019). Thus, the “stealth cell” is designed to avoid rejection by both alloreactive cytotoxic T cells and NK cells, which we believe has the potential to increase the ability of these cells to expand, persist, and mediate anti-tumor activity in unrelated recipients as summarized in the figure below.



We initiated a clinical trial of PBCAR19B in patients with R/R NHL in mid-2021 Flat doses of PBCAR19B CAR T cells following a standard lymphodepletion ("sLD") regimen of fludarabine (30 mg/m2/day × 3 days) and cyclophosphamide (1000 mg/m2/day × 3 days) are administered starting at Dose Level 1 (2.7×10^8 CAR T cells). We plan to commence dosing at the next dose level with clinical trial material from an optimized manufacturing process once released and expect to provide a program update in mid-2022.

PBCAR269A. PBCAR269A is an investigational allogeneic CAR T immunotherapy targeting BCMA for the treatment of R/R multiple myeloma. BCMA is a protein that is expressed on the surface of mature B cells called "plasma cells" that are responsible for the disease and is a validated CAR T cell target. Among 14 patients that have been evaluated for clinical activity and safety across four dose levels, including Dose Level 1= 0.6×10^6 cells/kg; Dose Level 2 = 2×10^6 cells/kg; Dose Level 3 = 6×10^6 cells/kg; and Dose Level 4 = 960 x10^6 cells flat dose, of PBCAR269A monotherapy following sLD, we have observed no Grade ≥ 3 CRS or ICANS and a dose-dependent increase in PBCAR269A peak expansion as of December 11, 2021. Overall, PBCAR269A monotherapy response observed in the Phase 1/2a trial was not comparable with autologous CAR T profiles. Therefore, we are continuing to enroll subjects with PBCAR269A in combination with nirogacestat in pursuit of a potential therapeutic index comparable with or better than autologous CAR T. An update on this combination program is expected to be presented in mid-2022.

CD19 Combination with Foralumab. In September 2021, we announced an exclusive license agreement with Tiziana to evaluate foralumab, an investigational, novel, fully human anti-CD3 monoclonal antibody, as an agent to induce tolerance of allogeneic CAR T cells to potentially improve the clinical outcome of CAR T cell therapy. The Cluster of Differentiation 3 ("CD3") is a receptor on effector T cells and an anti-CD3 antibody, such as foralumab, has the potential to eliminate or tolerize patient effector T cells. Our manufacturing process, which uses ARCUS to knock out the T cell receptor alpha chain ("TRAC") gene and implements a CD3-depletion step, produces allogeneic CAR T candidates that are >99.9% CD3-negative. We believe including an anti-CD3 antibody, such as foralumab, in the lymphodepletion regimen may prevent CAR T cell rejection by eliminating the anti-CAR T response and enable the CAR T cells to expand, proliferate, and persist to maximize long term clinical benefits. Foralumab may be used in combination with any PBCAR therapy. We will investigate foralumab first in combination with an anti-CD19 CAR T and plan to submit an IND amendment in 2022 to enable combination studies.

***In vivo* Gene Correction**

Our goal with our *in vivo* gene editing programs is to cure genetic diseases by correcting the DNA errors responsible for causing them. *In vivo* gene corrections are gene corrections that take place in a living organism. Our ARCUS platform is designed to enable safe, specific and efficient gene editing. Since ARCUS can be delivered via adeno-associated virus ("AAV") or lipid nanoparticles ("LNP"), it has potential utility in treating diseases in the liver as well as many genetic diseases that affect tissues beyond the liver. In addition, the unique enzymology of ARCUS enables it to efficiently knock out genes as well as make complex gene insertion and gene repair edits. We believe these unique attributes of ARCUS support its potential differentiation for *in vivo* use and its potential to treat a broader range of genetic diseases than other editing technologies.

We have advanced a deep portfolio of diverse programs toward preclinical efficacy and toxicity studies. We have generated a significant large animal dataset and have observed high-efficiency *in vivo* genome editing in non-human primates ("NHPs") in our preclinical studies, as highlighted in our July 2018 publication in *Nature Biotechnology*. We believe this is the first peer-reviewed publication of *in vivo* genome editing data in NHPs. In our preclinical studies, we observed the high-efficiency editing of the PCSK9 gene in NHPs using ARCUS and, even at the highest dose, the treatment was observed to be well-tolerated. As published in *Molecular Therapy* in June 2021, "Long-term Stable Reduction of Low-density Lipoprotein in Nonhuman Primates Following *In Vivo* Genome Editing," PBGENE-PCSK9 is supported by extensive NHP data over a three-year period, which demonstrates a long-term, stable edit accompanied by up to an 82% reduction from baseline in PCSK9 levels and up to a 62% reduction in low-density lipoprotein ("LDL") levels.

We expect that three of our preclinical programs will advance to IND or CTA submission in the next three years:

PBGENE-PCSK9. As part of an agreement to expedite development, iECURE expects to advance our PBGENE-PCSK9 candidate for FH through preclinical activities as well as a Phase 1 clinical trial with CTA submission expected as early as the end of 2022.

PBGENE-PH1. Pre-clinical research continues to progress for our wholly owned *in vivo* gene correction program applying ARCUS to knock out the HAO1 gene as a potential one-time treatment for PH1. In September 2021, we presented NHP data, showing on average, a 98.0% reduction in HAO1 mRNA and a 97.9% reduction in the encoded protein after a single administration of an AAV vector encoding ARCUS. We have initiated IND-enabling activities and expect to submit an IND/CTA in 2023 for PBGENE-PH1 delivered by LNP.

PBGENE-HBV. Our gene editing program for chronic HBV applies ARCUS to knock out persistent covalently closed circular DNA ("cccDNA") and potentially reduce viral persistence. Previously reported preclinical data has shown that ARCUS efficiently targeted and degraded HBV cccDNA in HBV-infected primary human hepatocytes and reduced expression of HBV S-antigen ("HBsAg") by as much as 95%. Similar levels of HBsAg reduction were observed in a newly developed mouse model of HBV infection following administration of ARCUS mRNA using LNP delivery. We expect to submit an IND/CTA in 2024 for our HBV program.

Our Team

We believe that our team, whom we call Precisioneers, has among the strongest scientific experience and capabilities of all genome editing companies. Our Chief Executive Officer, Michael Amoroso, who joined us in October 2021, brings extensive experience leading organizations focused on cell and gene therapies with a particular focus on oncology drugs, including CAR T cell therapies for hematologic malignancies. Derek Jantz, Ph.D., our Chief Scientific Officer and a co-founder of Precision, and Jeff Smith, Ph.D., our Chief Technology Officer and also a co-founder of Precision, have been working with genome editing technology for approximately 20 years. They are pioneers in the genome editing field and developed the ARCUS genome editing platform to address what they perceived as limitations in the existing genome editing technologies.

We have recruited our team of Precisioneers to include individuals with extensive industry experience and expertise in the discovery, development and manufacture of cell and gene therapies. As of December 31, 2021, our team of Precisioneers included 45 full-time employees with Ph.D. or M.D. degrees.

We are a purpose-driven organization, and we have carefully promoted a culture that values innovation, accountability, respect, adaptability and perseverance. We strive to ensure that our open, collaborative culture empowers Precisioneers to be their best selves and do their best work. We strongly believe that our shared values will help our team navigate and overcome challenges we may experience as we pursue our mission of improving life through genome editing. Our culture has helped build a world-class team with industry-leading experience in genome editing and continually attracts new talent to further build our capabilities. Our team is a group of motivated individuals that value the opportunity to contribute their time and talents toward the pursuit of improving life. Precisioneers appreciate high-quality research and are moved by the opportunity to translate their work into treatments and solutions that will impact human health.

Our Strategy

We are dedicated to improving life. Our goal is to broadly translate the potential of genome editing into permanent genetic solutions for significant unmet needs. Our strategy to achieve this goal includes the following key elements:

- **Create a fully integrated genome editing company capable of delivering solutions that address unmet needs impacting human health.** We believe that to be a leader in the field of genome editing and maximize the impact of our ARCUS genome editing platform, we must be able to control those elements of our business that may provide us with certain strategic advantages or operational efficiencies. We intend to continue to invest in comprehensive research, development, manufacturing and commercial capabilities that provide control and oversight of our product candidates from discovery through commercialization.
- **Capitalize on our emerging leadership position in *ex vivo* allogeneic CAR T immunotherapies which are developed from our ARCUS platform.** We believe that we have developed the first *ex vivo* allogeneic CAR T cell platform capable of producing drug product at scale, with a potentially optimal cell profile for therapeutic efficacy with a single gene editing step and true off-the-shelf delivery. Our CAR T platform is modular, which we believe will allow us to leverage proof-of-concept from our ongoing and planned initial human trials for multiple other CAR T programs. We believe the combination of these factors, along with our unique ARCUS technology, puts us in a differentiated position to be the leader in the development of allogeneic CAR T therapies.
- **Advance ARCUS-based *in vivo* gene correction programs into human clinical trials.** In our preclinical studies, we observed the high-efficiency and tolerability of *in vivo* genome editing using ARCUS in a non-human primate model, as published in *Nature Biotechnology* in July 2018 and *Molecular Therapy* in June 2021 by Wang et al. Nearly five years later, NHPs in this 2017 study continue to be monitored for ongoing, sustained reduction in LDL cholesterol levels while maintaining stable gene editing and data from these trials has not shown any obvious adverse effects to date. To our knowledge, we were the first company to complete this milestone, which we believe to be critical to successful *in vivo* genome editing therapeutic development. We have built on this early success by diligently advancing a diverse portfolio of preclinical *in vivo* gene correction programs through large animal studies, focusing initially on gene targets occurring in the liver.
- **Continue investing in the optimization of ARCUS and enabling technologies.** We believe that a key to our future success is the quality of the genome editing tools that we produce. Since our founding, we have devoted ourselves to continuously

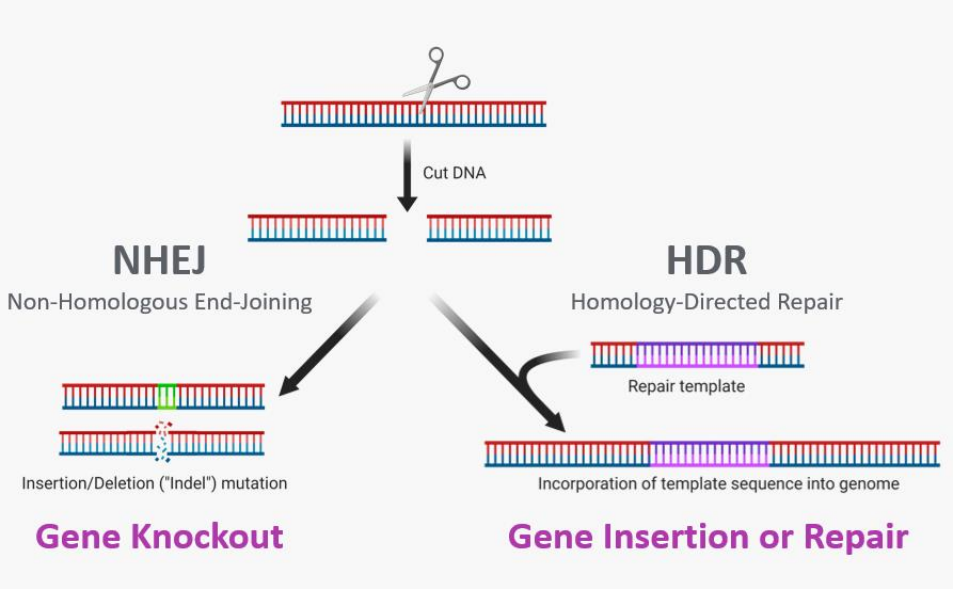
refining the precision and efficiency of our core genome editing platform. We intend to continue this investment in ARCUS while surrounding it with enabling technologies and expertise to retain what we believe is a leadership position in the field.

- **Create an environment that is a destination of choice for premier talent within the life sciences industry.** We believe that we currently have among the strongest skill set within the genome editing industry and credit much of our past success to our commitment to our team and culture. Our future success will depend on our ability to continue to attract and retain world-class talent within our markets of interest. We intend to consciously invest in fostering an environment within our company that is both challenging and supportive and inspires our team to broadly translate genome editing into permanent genetic solutions.
- **Expand the breadth of our operations through additional product platforms and strategic relationships.** We believe that the ARCUS genome editing platform has broad utility beyond our current areas of focus. We intend to invest in the development of additional product platforms and seek collaborations with companies with additive expertise in areas within and outside of our current target markets to maximize the value of our company.

Overview of Genome Editing

DNA carries the genetic instructions for all basic functions of a living cell. These instructions are encoded in four different molecules, called bases, which are strung together in specific sequences to form genes. Each gene is responsible for a specific function in a cell, and the complete set of genes in a cell, which can consist of tens of thousands of genes and billions of individual bases, is known as a genome. The complete genome sequence has been determined for many organisms, including humans. This allows scientists to identify specific genes and determine how their unique sequences contribute to a particular cellular function. Studying variations in gene sequences further informs an understanding of why a cell behaves a certain way, which can greatly enhance understanding of what causes and how to treat aberrant behavior that leads to disease.

Genome editing is a biotechnology process that removes, inserts or repairs a portion of DNA at a specific location in a cell's genome. Early applications of genome editing focused on advancing genetic research. As genome editing technologies have advanced, their application is moving beyond understanding disease to treating or preventing disease by editing DNA. Genome editing is accomplished by delivering a DNA cutting enzyme, called an endonuclease, to a targeted segment of genetic code. Once the endonuclease cuts the DNA, the cell has to repair the break to survive and will generally do so in one of two ways, as shown below.



There are two primary mechanisms of DNA repair, non-homologous end joining ("NHEJ"), and homology directed repair ("HDR"). As shown in the figure above, NHEJ is a pathway that repairs breaks in DNA without a template. NHEJ is the less precise method of repair that prioritizes speed over accuracy, making it prone to leaving insertions and/or deletions of DNA bases at the cut site. These insertions or deletions can disrupt the gene sequence and can be used to inactivate or "knock out" the function of the gene. Accordingly, genome editing technologies can be used to permanently knock out a gene in a cell or organism by creating a break in the DNA sequence of that gene.

As shown in the figure above, HDR is a mechanism of DNA repair whereby the cell uses a second DNA molecule with a sequence similar to that of the cut DNA molecule to guide the repair process. Since HDR uses a "template" of similar genetic information to guide the repair process, it is the more precise mechanism of cellular repair. HDR results in the sequence of the template being copied permanently into the genome at the site of the DNA cut. If we provide a template DNA molecule directly to the edited cell and the cell repairs itself using HDR, a new gene can be incorporated or "knocked in" at a precise location in the genome. Alternatively, the use of HDR can "repair" a DNA mutation by correcting it to the proper functioning sequence when repairing the break. Thus, genome editing endonucleases can be used to introduce a variety of different changes to the genetic code of a cell or organism including gene knockout, gene insertion and gene repair.

There are several genome editing technologies, including ARCUS, zinc-finger nucleases ("ZFNs"), TAL-effector nucleases ("TALENs"), CRISPR/Cas9, and base editors. These technologies differ from one another principally in the properties of the endonuclease that they each employ. The different endonucleases have fundamentally different mechanisms of recognizing and cutting their DNA targets, which gives each technology advantages and disadvantages depending on how each is used.

		ARCUS
Precision	Origin	Eukaryotic homing endonuclease, evolved for gene insertion
	Resting state	Inactive
Versatility	Cut type	Consistent 3′ overhang
	• *Repair mechanism*	Primarily HDR
	• *Ability to track off-target edits*	Very High
	Size	Small
	• *Delivery with single AAV*	✓

Our ARCUS Genome Editing Platform

We are pioneers in the field of genome editing and have extensive experience with a breadth of genome editing technologies. Our ARCUS platform was developed to address limitations of other editing technologies that could impair their deployment for therapeutic applications. We looked to nature for examples of genome editing and found the I-CreI endonuclease from the algae *Chlamydomonas reinhardtii*. Unlike ZFN, TALEN or CRISPR/Cas9, I-CreI is a natural enzyme that evolved to edit a large, complex genome. In nature, it is responsible for modifying a specific location in the algae genome by inserting a gene using the HDR process, according to scientific literature.

We believe that I-CreI has a number of attributes that make it attractive for the development of novel genome editing endonucleases, such as:

- **Specificity and efficiency.** Complex genome editing applications, especially those involving the human body, require a high level of endonuclease specificity and precision to limit the likelihood that the endonuclease will recognize and edit any genetic sequence other than its intended target. Most applications of genome editing technology require that a sufficient portion of the targeted cells are edited to achieve the desired result. The activity level of the endonuclease is one factor that can affect how many cells are edited. The slow catalytic mechanism of I-CreI imparts specificity but does not impact its on-target efficiency for genome editing purposes because genome editing involves cutting only a single site in a cell. As such, I-CreI is able to achieve a high level of precise on-target editing while rarely cutting off-target, as supported by scientific literature.
- **Delivery.** Size and structural simplicity affect the ease and versatility with which endonucleases can be delivered to cells for editing. I-CreI is very small relative to other genome editing endonucleases. It is approximately one quarter to one sixth of the size of the ZFN, TALEN and CRISPR/Cas9 endonucleases. Unlike those endonucleases, I-CreI can be delivered as a single gene. As such, we believe it is compatible with many different delivery mechanisms. Additionally, I-CreI's size and structure facilitate the simultaneous delivery of multiple engineered endonucleases to introduce more than one edit to a cell. Both of these properties significantly broaden the spectrum of potential applications for I-CreI-based genome editing endonucleases.

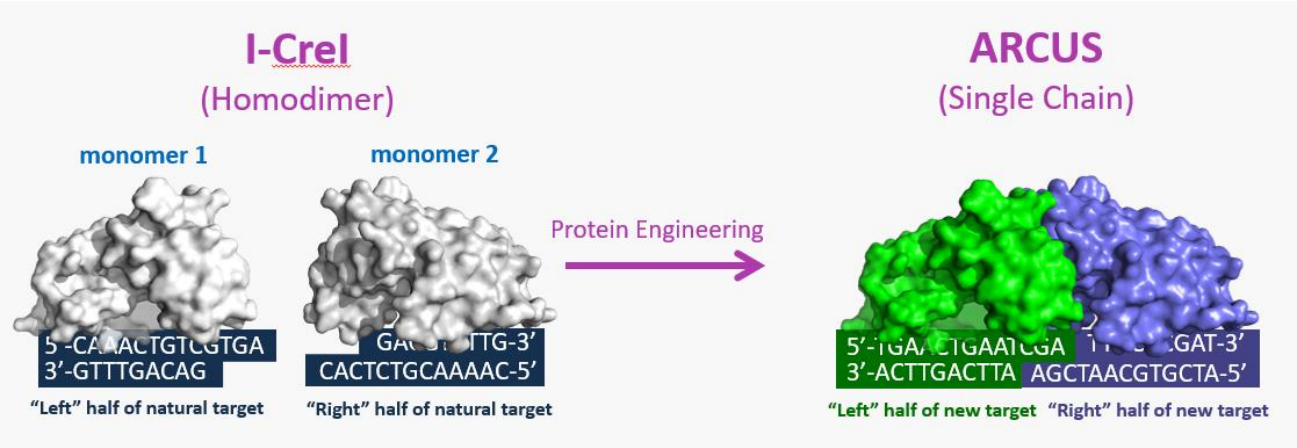
- **Type of Cut.** The three prime, or 3', overhangs created when I-CreI cuts DNA have been shown to promote DNA repair through a mechanism called HDR. 3' overhangs are stretches of unpaired nucleotides in the end of a DNA molecule. A genome editing technology that facilitates cellular repair through HDR enables versatile applications that require a gene insertion or gene repair. Unlike other editing endonucleases, I-CreI creates four base 3' overhangs when it cuts its DNA site, which increases the likelihood that the cell will repair the DNA cut through HDR. As such, the DNA cuts created by I-CreI can be exploited to efficiently insert or repair DNA, consistent with the natural role of I-CreI in catalyzing the targeted insertion of a gene in algae.
- **Intellectual Property.** I-CreI recognizes its DNA target site through a complex network of interactions that is challenging to re-program for new editing applications involving different DNA sequences. The challenges associated with re-programming I-CreI have, historically, hampered its adoption by the genome editing community in favor of more easily engineered endonucleases. This engineering challenge represents a high barrier to entry and has enabled us to secure a strong intellectual property position and control over what we believe to be a superior genome editing technology.

Other than the key programming challenge, we believed that the differentiated properties of I-CreI cited above make it an ideal "scaffold" for the development of novel genome editing tools. Moreover, we believed those properties were differentiated enough from other editing technologies to merit substantial investment in overcoming the key challenge of programmability. To that end, we invested 15 years of research effort to develop a robust, proprietary protein engineering method that now enables us to consistently re-program I-CreI to direct it to targeted sites in a genome. We call our approach ARCUS.

ARCUS is a collection of protein engineering methods that we developed specifically to re-program the DNA recognition properties of I-CreI, a homing endonuclease from *Chlamydomonas reinhardtii* algae evolved for precision genome editing in nature. To apply I-CreI to genome editing in other cells or organisms, we must modify it to recognize and cut a different DNA sequence for each new application we pursue. Since the I-CreI endonuclease evolved to recognize its target sequence in the algae genome with a high degree of selectivity, as supported by scientific literature, it was necessary for us to develop sophisticated protein engineering methods to re-engineer I-CreI endonucleases to bind and cut a different DNA sequence. Using the ARCUS process, we create customized endonucleases for particular applications. We call these custom endonucleases "ARCUS nucleases." Our process is proprietary and core components are claimed in an extensive international patent portfolio. Moreover, since the ARCUS process involves a sophisticated blend of protein engineering art and science, each ARCUS nuclease we create is novel and, we believe, patentable. As of December 31, 2021, we have obtained U.S. patents with claims directed to six ARCUS nucleases as compositions of matter, and currently claim over 290 ARCUS nucleases as compositions of matter in pending U.S. and foreign patent applications.

Our objective with ARCUS is to redirect I-CreI to a new location in a genome without compromising its editing abilities. To accomplish this, we modify the parts of the enzyme that, as reported by scientific literature, are involved in recognizing the specific DNA target site. These enzyme parts are also reported to comprise the I-CreI active site and to be involved in anchoring the enzyme to its DNA site in the algae genome. In our preclinical studies, we have observed that these modifications allowed us to control how tightly an engineered variant of I-CreI binds to its intended DNA site, as well as how quickly it cuts, in a plant or animal cell. By adjusting these two parameters, we observed that we can generally control the efficiency with which the engineered endonuclease cuts its intended target site or any potential off-target sites.

The natural I-CreI target site is pseudo-palindromic, meaning the first half of the sequence is approximately a mirror image of the second half of the sequence. Palindromic DNA sites are rare in most genomes so it was necessary for us to develop additional technology that would overcome this limitation on the diversity of DNA sites that we can target. To this end, the ARCUS process involves the production of *two* re-programmed I-CreI proteins for each target site. These two different proteins are then linked together into a single protein that can be expressed from a single gene. This approach, called a "single-chain endonuclease," represents a major advancement in I-CreI engineering because it enables our ARCUS nucleases to recognize and cut *non*-palindromic target sites using an endonuclease that, like natural I-CreI, is very small and easy to deliver to cells.



Since creating an ARCUS nuclease requires such extensive reengineering of I-CreI, it is, generally, an iterative process that involves multiple cycles of design and testing. We can typically produce a first-generation ARCUS nuclease in seven weeks. First-generation nucleases are suitable for research and development, proof-of-concept studies or other non-therapeutic applications. For therapeutic applications requiring the lowest possible off-targeting, however, we are rarely satisfied with generation one and each endonuclease undergoes extensive optimization. To this end, we thoroughly interrogate the nuclease with respect to its on-and off-target cutting properties using ultra-sensitive tests that we developed specifically for use with ARCUS. These results then inform our design of a second-generation nuclease with the goal of optimizing on-target efficiency while minimizing off-target cutting. Therapeutic ARCUS nucleases typically require two to four cycles of design and testing, often resulting in off-target cutting frequencies that are below the limit of detection with our most sensitive assays. This process can take six months to one year and results in development of our clinical candidate nuclease.

The ARCUS process is robust and reproducible. It enables us to create engineered variants of the I-CreI endonuclease that recognize and cut DNA sites that bear little resemblance to I-CreI's natural target site. Importantly, however, ARCUS retains the attributes of I-CreI that we believe make it highly suitable as a genome editing endonuclease for complex commercial applications. We expect ARCUS nucleases to be exquisitely specific as a result of the natural structure of I-CreI and the intricate design process we employ to create them. We believe ARCUS nucleases are the smallest and easiest to deliver genome editing endonucleases. Like I-CreI, in our preclinical studies, ARCUS nucleases have been observed to produce DNA cuts with 3' overhangs that promote HDR, facilitating gene insertions and gene repairs in addition to gene knockouts. We believe that these attributes will enable us to translate ARCUS into patient-based clinical trials and a wide array of product candidates that have the potential to address the limitations of other genome editing technologies and improve life.

We believe that ARCUS is a leading genome editing platform for therapeutic applications. Realizing the potential of ARCUS, however, requires supporting technologies and capabilities. To facilitate the potential commercial deployment of ARCUS in different fields, we surround it with ancillary technologies, domain expertise and infrastructure specific to that area of development. Our goal is to leverage ARCUS to build additional product-development platforms designed to rapidly generate new products in a given field.

Our *Ex Vivo* Allogeneic CAR T Immunotherapy Platform

We are leveraging the properties of ARCUS in an integrated platform for the development and large-scale production of *ex vivo* off-the-shelf (allogeneic) CAR T cell immunotherapies. A key to the success of this platform is our proprietary, one-step method for modifying the genetics of T cells from a healthy donor to make them detect and kill cancer cells. This method allows us to produce allogeneic CAR T therapy candidates with a potentially optimal phenotype for clinical development and scaled manufacturing. We have demonstrated that our approach yields an allogeneic product with a high proportion of naïve and central memory CAR T cells, which are the T cell phenotypes that have previously correlated best with good clinical benefit and fewer adverse events compared with terminally differentiated effector T cells. Additionally, because these cells are derived from healthy donors and maintain the

phenotypic characteristics described, it is our hypothesis that they will be more capable of controlled *in vivo* expansion and tumor killing. As such, we believe that our allogeneic CAR T cell platform will greatly increase patient access to these cutting-edge treatments.

CAR T Cell Therapies

CAR T cell therapy is a form of cancer immunotherapy that uses a patient's immune system to kill cancer cells. T cells are a component of the immune system that can distinguish pathogen-infected or tumor cells from healthy cells and kill them. Recognition of pathogen-infected cells or tumor cells occurs through a protein called a TCR, that is expressed on the surface of T cells. Tumor cells, however, have evolved numerous ways to evade TCR-mediated killing by T cells. In CAR T cell therapy, T cells are engineered *ex vivo* to express a protein called a CAR that recognizes specific tumor cell surface targets and allows the T cells to function independently of the TCR, thus circumventing tumor cells' evasion of the TCR. CAR T cell therapy has been shown in clinical trials to be an effective treatment for patients who have not responded to traditional cancer treatments, and there are FDA approved CAR T cell products available to treat certain types of leukemia and lymphoma.

The most common form of CAR T cell therapy is referred to as "autologous" CAR T cell therapy because the CAR T cells are generated using T cells taken directly from the cancer patient. T cells are harvested from the patient, genetically engineered *ex vivo* to express a CAR, and then injected back into the patient. While autologous CAR T cell therapy has been shown to be effective for treating certain tumor types, it has several significant drawbacks:

- **Patient eligibility.** Many patients may not be eligible for the treatment because their cancer has lowered their T cell numbers and T cell quality, or because the risk of undergoing the process to harvest T cells is too great.
- **Consistency.** Since each autologous therapy is, by definition, unique, it is difficult to define standards of safety and efficacy or to thoroughly assess the quality of the product prior to infusion into the patient.
- **Delay in treatment.** Because the process to make autologous CAR T cells can take several weeks, there is a significant delay in treating what can often be very aggressive tumors. Patients' disease often progresses before they can receive the CAR T therapy, or if manufacturing complications such as contamination, mislabeling or low yield are encountered, the patient may not survive long enough to attempt manufacturing a second time.
- **Cost.** The autologous CAR T cell manufacturing process is complex and expensive and must be performed, in its entirety, for each patient. As such, scaling of the manufacturing process is exceedingly difficult, and the cost of product manufacturing has resulted in high treatment costs per patient. This high cost of treatment, along with the practical complexities described above, limits the availability of autologous CAR T cell therapies to patients.

Our Approach to *Ex Vivo* Allogeneic CAR T Cells

We believe that the use of *ex vivo* allogeneic, or donor-derived, CAR T cells will address many of the challenges associated with autologous CAR T cell therapy. An allogeneic approach allows selection of donors using specific criteria to define "healthy" T cells possessing specific phenotypes, which we believe are important to clinical efficacy and which may lessen the product-to-product variability seen in autologous therapies. Donor-derived cells could be used in any patient, eliminating the "one patient: one product" burden of autologous CAR T cell therapies. Because healthy donors would provide the starting material, patients that were too sick or otherwise unqualified for an autologous approach may benefit from an allogeneic CAR T cell therapy. Additionally, patients receiving an off-the-shelf allogeneic treatment would not have to wait for the manufacture of a personalized autologous treatment, which could be further delayed by manufacturing difficulties. By scaling the manufacturing of CAR T cells and optimizing the manufacturing process for a specific pool of donors, we believe that allogeneic CAR T cells can be manufactured at costs that are significantly lower than autologous CAR T cells and that will, over time, approach the manufacturing costs for conventional biologic drugs. These potential advantages of an allogeneic approach should allow for a safer, more predictable product with defined quality standards and significantly increase patient access.

We have used the unique qualities of ARCUS to create a one-step cell engineering process for allogeneic CAR T cells that we believe yields a well-defined cell product and is designed to maintain naïve and central memory T cell phenotypes throughout the CAR T manufacturing process; we believe this is of paramount importance for an optimized CAR T therapy. To produce an allogeneic CAR T cell, it is necessary to make two changes to the DNA of T cells from a healthy donor. First, it is necessary to knock out the gene that encodes the TCR to prevent the donor-derived T cells from eliciting GvHD in the patient. The TCR is actually a complex of several different components encoded by different genes, and knocking out any one of them is generally sufficient to prevent the TCR from functioning. Second, it is necessary to add, or knock in, a gene that encodes the CAR to give the T cells the ability to recognize and kill cancer cells. We developed a proprietary, one-step method for achieving both genetic changes simultaneously. This method, aspects of which are protected by nine issued U.S. patents, involves the use of ARCUS to target the insertion of a CAR gene directly into the gene that encodes the alpha subunit of the TCR. This approach adds the DNA encoding the CAR while simultaneously disrupting the DNA encoding the TCR, essentially replacing one gene with the other.

We believe that our one-step engineering approach, and the differentiated attributes of the ARCUS nuclease used to implement it, will overcome many of the critical challenges associated with allogeneic CAR T cell production as follows:

- **T cell phenotype.** According to scientific literature, T cell phenotype has a profound impact on the efficacy of CAR T cell therapy. Specifically, "young" CAR T cells with naïve and central memory phenotypes have been observed to undergo the most robust expansion following administration, which leads to a therapeutic effect. Therefore, we have established a T cell platform that is designed to maximize the percentage of cells with these ideal phenotypes. Our process starts with carefully screening donors to identify individuals with high percentages of naïve or central memory T cells and a ratio of CD4:CD8 T cells that we believe should yield the most potent cell product. To this end, we have developed our own set of analytics for screening candidate donors and have put significant effort into identifying individuals with the desired T cell profiles. We then use proprietary growth strategies and media to maintain naïve and central memory T cell phenotypes throughout the CAR T manufacturing process. We believe this is of paramount importance for an optimized CAR T therapy. Importantly, our one-step genome editing approach avoids making multiple breaks to the T cell's DNA and also contributes to minimizing cell processing time, which helps prevent the CAR T cells from differentiating during the process.
- **Novel co-stimulatory domain.** Our genetically engineered CAR T cells incorporate a novel, proprietary, costimulatory domain called N6, which may enable us to enhance cell proliferation and effector function while preserving cell phenotype. We engineered N6 to improve on the function of the 4-1bb costimulatory domain commonly used in autologous CAR T products. Our preclinical data suggests that, compared to 4-1bb, N6 provides an activation signal to the CAR T cells that better preserves cell expansion potential while maintaining naïve cell phenotype following exposure to cancer cells. We also believe N6 can help avoid CAR T cell hyperstimulation, which can contribute to adverse events seen with autologous products.
- **Consistency.** By consistently targeting the same insertion of the CAR gene to a defined location in the DNA of the cell, we are able to produce populations of T cells that are identical at the DNA level. This makes the cells in our CAR T cell drug formulation less heterogeneous as compared to manufacturing processes that use lentiviral vectors. Importantly, our genome editing process gives us greater control over the amount of CAR that is expressed on the surface of each CAR T cell, which determines how easily the CAR T cell is activated once it encounters a cancer cell. This allows us to "fine-tune" the CAR T cells to ensure that they respond appropriately to the cancer but do not become hyper-activated or exhausted. The below comparison demonstrates the difference in consistency achieved by using lentivirus delivery compared with targeted delivery through an ARCUS nuclease. CAR T cells produced using ARCUS exhibit reduced cell-to-cell variability as well as more controlled levels of CAR gene expression depending on whether the cells are tuned for high expression or low expression.
- **Scalability.** To realize the potential benefits of allogeneic CAR T cell therapy, it will be important to manufacture as many cells as possible in each batch in accordance with cGMP. Scaling efficiently requires scale-up at every step in the process and, as with all drug manufacturing, process development takes significant time and capital. In July 2019, we opened our Manufacturing Center for Advanced Therapeutics ("MCAT") facility. We made the decision early in the development of our CAR T cell platform to invest in process development and manufacturing rather than initiating clinical trials with a process that would not fully support development and commercialization. We did this, in part, because we believed that several attributes of ARCUS, such as high specificity and high knock-in efficiency, would allow us to scale manufacturing more effectively than our competitors. As a consequence of our early investment and the one-step editing method enabled by ARCUS, we have scaled our manufacturing process today, adding in-house capabilities through the opening of our MCAT facility. In 2020, we manufactured the first batch and clinical trial material for PBCAR269A and produced clinical trial material for PBCAR19B stealth cell.

Manufacturing

We believe that we have strong internal scientific process development and manufacturing capabilities, including our MCAT, an in-house cGMP compliant manufacturing facility supporting our therapeutic product development platforms which we opened in 2019. We believe that having internal manufacturing capacity and expertise is a competitive advantage that enables enhanced control over process development timelines, costs and intellectual property.

We have leased over 33,800 square feet of space for our MCAT facility at a location approximately seven miles from our headquarters in Durham, North Carolina. We have four cleanroom production suites for CAR T cell, mRNA and AAV production for process development for our allogeneic CAR T immunotherapy platform. Our manufacturing facility leverages single-use, disposable, closed-system operations aligned to our technology platforms to ensure both flexibility and cost effectiveness. The initial scope is creating clinical trial material for certain of our planned clinical trials. During 2021, MCAT continued to support our *ex vivo* cell therapy products through execution of our manufacturing strategy, including the manufacture of clinical trial material for use in our PBCAR0191, PBCAR19B, and BCMA studies and ensuring on time delivery of drug product to the clinic. In addition, we completed the Commissioning, Qualification, and Validation ("CQV") of the AAV manufacturing suites to support our *in vivo* gene therapy pipeline of products.

We currently contract with third parties for the manufacturing and testing of materials used in the production of our product candidates. To date, our third-party manufacturers have met our manufacturing requirements. Supply chain constraints affecting the industry have also impacted MCAT. Lead times for certain single-use components have been extended but have not materially constrained our ability to produce clinical trial materials to date. In addition to existing supply agreements for our most critical reagents and supplies, we believe that there are alternate sources of supply that can satisfy our requirements and dual sourcing strategies are being employed in select instances to mitigate risk. However, continued global impacts from the COVID-19 pandemic have led to longer timelines and greater costs.

The manufacturing process for our allogeneic CAR T immunotherapy platform utilizes a one-step cell engineering method in which a CAR gene is targeted directly into the TRAC locus. We believe this single step approach not only minimizes translocation safety concerns, but also greatly streamlines the manufacturing process and have entered into a license agreement with a principal supplier for research and clinical licensed technology used in such process. Commercial raw materials and reagents for this production are readily available. Our manufacturing strategy for our *in vivo* gene correction platform is to internally control process development and manufacturing to safeguard the proprietary nature of our technology and facilitate our ability to function as an integrated life sciences company.

Our *in vivo* Gene Correction Platform

Overview

We expect *in vivo* therapies for genetic and infectious diseases to be a significant focus of our operations long-term because the differentiated attributes of ARCUS are particularly advantageous for this type of application. *In vivo* gene correction involves the delivery of ARCUS nucleases directly into a patient's cells to treat disease at the level of the underlying DNA. *In vivo* genome editing is more complex and challenging than *ex vivo* approaches like CAR T cells due to the need to safely deliver ARCUS directly to cells in the body. We believe that *in vivo* applications are particularly well suited to ARCUS because they require extremely low levels of off-target editing and efficient delivery.

Due to the demands of *in vivo* editing, we are taking a highly disciplined approach to managing our project portfolio that emphasizes studies in large animals, using both viral and non-viral delivery technologies.

Treatment of Genetic Disease

Genetic diseases are caused by errors in the DNA that lead to dysfunction of a cell or tissue. While the underlying cause of a particular genetic disease can often be complex and variable, DNA errors generally fall into two categories: loss-of-function or gain-of-function. Genetic diseases are most frequently caused by loss-of-function errors in which a particular gene is mutated at the DNA level in such a way that it is either non-functional or less functional than it should be. In these cases, treating the disease requires *adding* the function that the cell or tissue is otherwise lacking. Gain of function genetic disorders are the result of DNA errors that cause a gene to acquire a new, harmful function that leads to disease. In these cases, it is necessary to remove the unwanted function to treat the disorder.

Genetic disease is a very active area of therapeutic development, and the therapies that are available or in development are, to a large extent, as variable and specialized as the diseases themselves. There are, however, gene therapy platform approaches that are being broadly applied to the treatment of multiple genetic disorders. For the treatment of loss-of-function diseases, AAV-based gene therapy can often be an effective treatment. AAV is a non-integrating virus that can be used to deliver DNA to a wide range of different cell types in a patient. The virus can be engineered to deliver a functional copy of a gene that is otherwise missing or under-performing in the cell. This approach can, in some cases, restore normal function to the cell and alleviate the symptoms of the disease.

While a number of AAV-based gene therapies appear to be showing great promise in clinical trials, the approach is subject to a number of limitations. Many patients have antibodies in their blood that recognize and inactivate the AAV virus before it can deliver the DNA into the patient's cells. In addition, among patients who do *not* have antibodies upon initial treatment with the virus, most will develop antibodies following the first dose. Therefore, in most cases, it is only possible to dose a patient one time. Most importantly, although AAV-based gene therapy can be an effective treatment, it may not be a permanent *cure* because AAV-delivered genes do not generally persist for more than a few years in the body. While the duration of virus persistence varies from cell-to-cell and from patient-to-patient, it is not believed to be permanent and symptoms of the disease can return once the virus is no longer present in the body.

Our Approach to in vivo Gene Correction

Our goal is to cure genetic diseases by correcting the DNA errors responsible for causing them. In principle, *in vivo* genome editing can likely be used to cure any genetic disorder. In practice, however, *in vivo* genome editing is limited by several challenges that, we believe, are best addressed using ARCUS:

- **Specificity.** *In vivo* genome editing requires an extremely high degree of precision to minimize the occurrence of any unwanted off-target editing. Off-target changes to the DNA could, potentially, have significant safety implications that may not manifest themselves until well after administration of the therapy. As described above, we believe that the differentiated attributes of ARCUS enable us to create endonucleases that have a high degree of specificity and minimal levels of off-target editing to address this significant safety concern.
- **Delivery.** Gene therapy delivery technologies suitable for the delivery of genome editing tools to tissues *in vivo* have not been developed for all tissues. Delivery challenges are particularly pronounced for editing applications that require promoting DNA repair by HDR because it is necessary to deliver both the nuclease and the DNA "donor" template for HDR. We have focused our initial development efforts on genetic disorders of the liver, tissue for which we believe we have good options for delivery via LNP or AAV and in which we have shown ARCUS to be effective in preclinical studies. We believe the small size of our ARCUS nucleases and their ability to efficiently promote HDR will enable us to address a greater variety of genetic diseases requiring more complex delivery strategies.
- **Efficiency.** Genome editing efficiency is a critical parameter for *in vivo* therapeutic efficacy because the requisite edit must be achieved in a sufficient number of cells to have therapeutic benefit. Efficiency is best measured *in vivo* in animals because it is affected by multiple parameters including delivery, endonuclease activity and the accessibility of the DNA target site in the organism. Moreover, we believe that only large animals such as NHPs accurately model these different parameters and are representative of the human condition. As such, we have placed significant emphasis on large animal studies and have demonstrated, we believe, therapeutic levels of editing efficiency using ARCUS in the most relevant models. This gives us greater confidence that ARCUS will translate from the lab bench to the clinic.

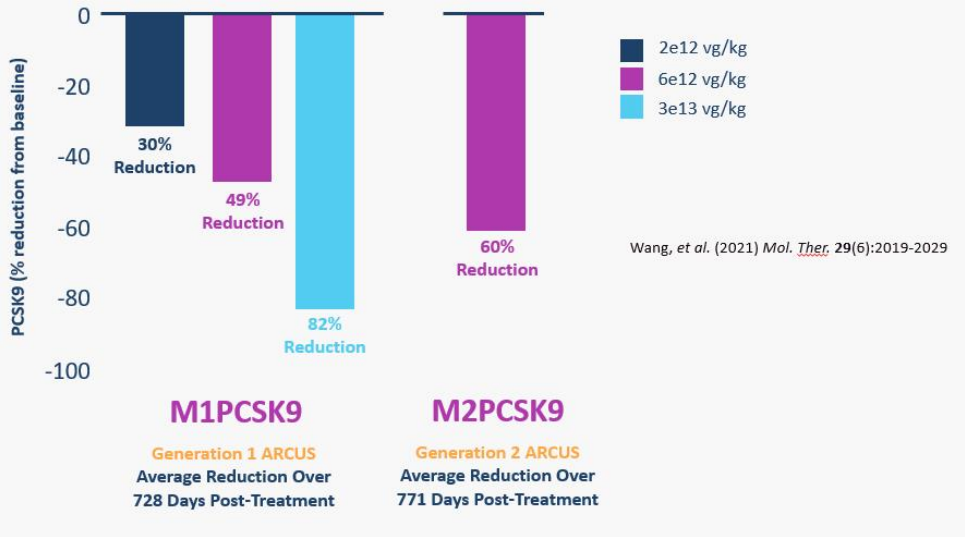
The potential of ARCUS for *in vivo* genome editing is highlighted in a July 2018 publication in *Nature Biotechnology* that describes a research project performed as part of a sponsored research collaboration between our company with Dr. Jim Wilson and the Gene Therapy Program at the University of Pennsylvania. Co-authors of the publication include Derek Jantz and Jeff Smith, two of our co-founders. This publication is, to our knowledge, the first peer-reviewed publication of *in vivo* genome editing data in NHPs. We reported well-tolerated, long-term, high-efficiency editing of the PCSK9 gene in NHPs using ARCUS. A single IV administration of an AAV vector encoding a PCSK9-specific ARCUS nuclease was able to efficiently knock out the gene in the livers of Rhesus macaques, a species of monkey. Importantly, even at the highest dose the treatment was observed to be well tolerated in the study.

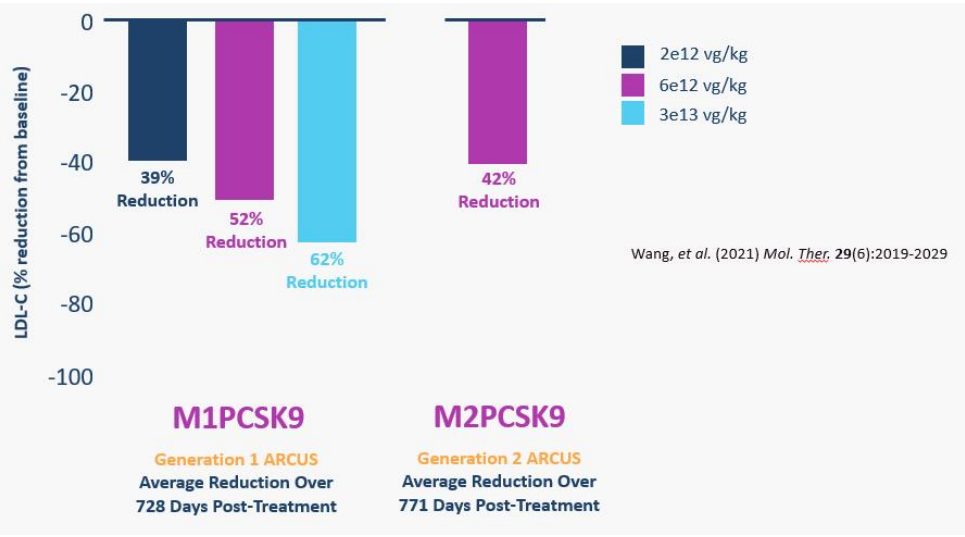
We believe that establishing collaborations with other groups that have additive domain expertise and access to the most relevant animal models will be important to advancing our *in vivo* gene correction platform, and we have entered into a number of collaborations and licensing agreements with third parties to help us advance our *in vivo* editing portfolio.

Familial Hypercholesteremia (FH) Development Program (PBGENE-PCSK9)

Our gene editing program for FH seeks to knockout expression of the PCSK9 gene. As published by Wang et al. in *Molecular Therapy* in June 2021, "Long-term Stable Reduction of Low-density Lipoprotein in Nonhuman Primates Following *In Vivo* Genome Editing," NHPs in this 2017 study continue to be monitored for ongoing, sustained reduction in LDL cholesterol levels while maintaining stable gene editing without any obvious adverse effects. After the one-time vector administration, NHPs treated with ARCUS have experienced stable reductions of up to 82% in PCSK9 protein levels and a 62% reduction of LDL cholesterol levels.

PCSK9 and LDL Serum Levels





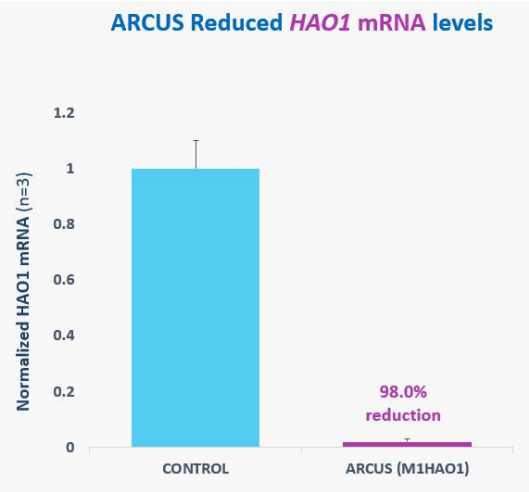
AAV was selected as the delivery technology for PBGENE-PCSK9. The underlying genetic causes of FH result in reduced lipid uptake by the liver, which may impair LNP uptake by hepatocytes.

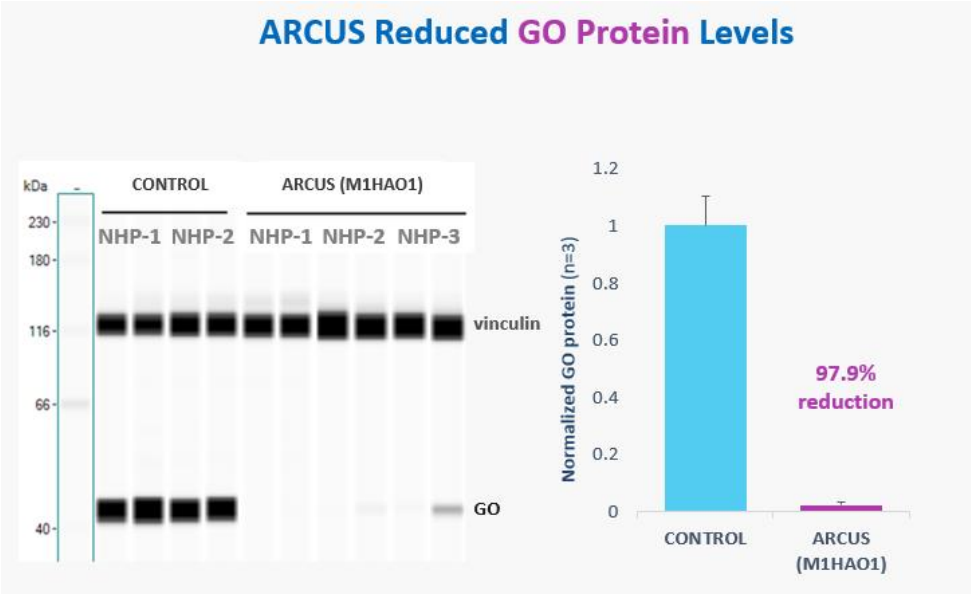
Primary Hyperoxaluria Type 1 (PH1) Development Program (PBGENE-PH1)

PH1 is a potentially fatal genetic disease caused by a gene mutation that leads to the accumulation of calcium oxalate crystals in the kidneys. PH1 affects approximately 1-3 people per million in the United States and is caused by loss of function mutations in the AGXT gene. This gene encodes an enzyme which is involved in the production of the amino acid glycine in the liver. In patients with PH1 who lack this enzyme, crystals of calcium oxalate form in the kidneys leading to painful kidney stones which may ultimately lead to renal failure. Approximately 40% of PH1 patients are found to have already progressed to end stage renal disease at the point of diagnosis, requiring a combined liver-kidney transplant.

Using ARCUS, we are developing a potential therapeutic approach to PH1 that involves knocking out a gene called HAO1 which acts upstream of AGXT. Suppressing HAO1 has been shown in preclinical models to prevent the formation of calcium oxalate. We therefore believe that a one-time administration of an ARCUS nuclease targeting HAO1 may be a viable strategy for a durable treatment of PH1 patients. LNP was selected as the delivery technology for PBGENE-PH1 and we expect to file an IND in 2023.

In preclinical studies we have demonstrated that ARCUS treatment decreased HAO1 mRNA levels by 98% and decreased Glycolate Oxidase (“GO”) protein levels by 97.9% in NHPs.





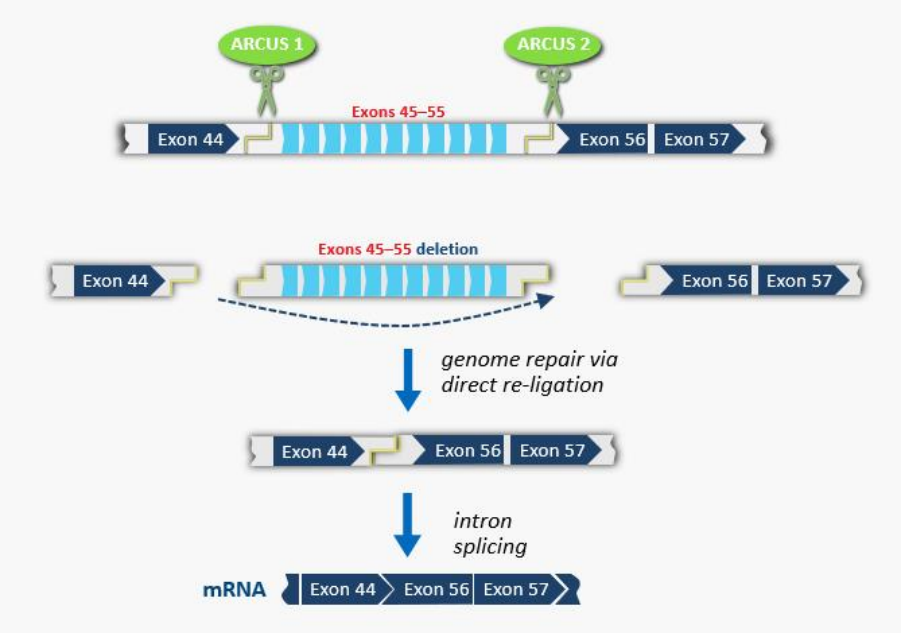
Chronic Hepatitis B (PBGENE-HBV)

Current standard-of-care treatments for HBV suppress viral replication, but often do not clear the virus, leaving cccDNA and integrated HBV genomes that enable viral persistence. ARCUS-mediated inactivation of cccDNA and integrated HBV through LNP delivery could result in a functional cure.

To address the challenge of a lack of an *in vivo* model of human HBV infection, we developed a novel *in vivo* model for HBV editing based on the similarities of HBV to AAV, in particular, both infect hepatocytes and both establish latency as extrachromosomal circular DNA elements. HBV genome sequences are delivered on an AAV vector and are then deleted by ARCUS delivered by LNP. LNP-ARCUS efficiently edited HBV sequences in an immunodeficient mouse model and a NHP model.

Duchenne Muscular Dystrophy (PBGENE-DMD)

ARCUS genome editing has previously been shown to increase expression of a shortened version of dystrophin in cultured myoblasts from a DMD patient. The approach uses two ARCUS nucleases delivered by a single AAV to simultaneously cut and delete a large segment of the dystrophin gene that encodes exons 45 through 55 of dystrophin – a region of the gene that accounts for more than 50% of DMD-causing mutations.



License and Collaboration Agreements

Eli Lilly and Company

On November 19, 2020, we entered into a development and license agreement, subsequently amended by the First Amendment to the Development and License Agreement dated August 9, 2021 (as amended, the "Development and License Agreement") with Lilly to collaborate to discover and develop *in vivo* gene editing products incorporating our ARCUS nucleases. Lilly has initially nominated Duchenne muscular dystrophy, a liver-directed target and a CNS directed target. Under the terms of the Development and License Agreement, Lilly has the right to nominate up to three additional gene targets over the first four years of the Development and License Agreement (the "Nomination Period"). Lilly may extend the Nomination Period for an additional two years from the date on which such initial Nomination Period ends, upon Lilly's election and payment of an extension fee. Additionally, under the terms of the Development and License Agreement, Lilly has the option to replace up to two gene targets upon Lilly's election and payment of a replacement target fee. Under the terms of the Development and License Agreement, Lilly will receive an exclusive license to research, develop, manufacture and commercialize the resulting licensed products to diagnose, prevent and treat any and all diseases by *in vivo* gene editing directed against the applicable gene target. The Development and License Agreement provides that we will be responsible for conducting certain pre-clinical research and IND/CTA enabling activities with respect to the gene targets nominated by Lilly to be subject to the collaboration, including manufacture of initial clinical trial material for the first licensed product. Lilly will be responsible for, and must use commercially reasonable efforts with respect to, conducting clinical development and commercialization activities for licensed products resulting from the collaboration, and may engage us for additional clinical and/or initial commercial manufacture of licensed products.

Upon closing of the Development and License Agreement on January 6, 2021, we received an upfront cash payment of $100.0 million. We will also be eligible to receive milestone payments of up to an aggregate of $420.0 million per licensed product as well as nomination fees for additional targets and certain research funding. If licensed products resulting from the collaboration are approved and sold, we will also be entitled to receive tiered royalties ranging from the mid-single digit percentages to the low-teens percentages on world-wide net sales of the licensed products, subject to customary potential reductions. Lilly's obligation to pay royalties to us expires on a country-by-country and licensed product-by-licensed product basis, upon the latest to occur of certain events related to expiration of patents, regulatory exclusivity or a period of ten years following first commercial sale of the licensed product. Simultaneously with the entry into the Development and License Agreement, we entered into a Share Purchase Agreement with Lilly

(the “Share Purchase Agreement”), pursuant to which Lilly purchased 3,762,190 shares of our common stock for a purchase price of $35.0 million.

iECURE

In August 2021, we entered into a development and license agreement with iECURE under which iECURE plans to advance our PBGENE-PCSK9 candidate through preclinical activities as well as a Phase 1 clinical trial as partial consideration for a license to our PCSK9-directed ARCUS nuclease to develop gene-insertion therapies for four other rare genetic diseases, including OTC deficiency, Citrullinemia Type 1, PKU, and another program focused on liver disease (the “iECURE Agreement”).

Pursuant to the iECURE Agreement, we retain the rights to PBGENE-PCSK9, including all products developed for indications with increased risk of severe cardiovascular events such as FH. Simultaneously with the entry into the iECURE Agreement, we entered into an Equity Issuance Agreement with iECURE, pursuant to which iECURE granted us partial equity ownership in iECURE as partial consideration for the license to use our PCSK9-directed ARCUS nuclease.

Servier

In February 2016, we entered into the Servier Agreement with Servier, pursuant to which we agreed to develop allogeneic CAR T cell therapies for five unique antigen targets. One target was selected at the Servier Agreement’s inception. Two additional hematological cancer targets beyond CD19 and two new solid tumor targets were selected in 2020. With the addition of these new targets, we received development milestone payments in 2020. Upon selection of an antigen target under the Servier Agreement, we agreed to perform early-stage research and development on individual T cell modifications for the selected target, develop the resulting therapeutic product candidates through Phase 1 clinical trials and prepare initial clinical trial material of such product candidates for use in Phase 2 clinical trials.

On April 9, 2021, we entered into the Program Purchase Agreement with Servier, pursuant to which we reacquired all of our global development and commercialization rights previously granted to Servier pursuant to the Servier Agreement, and mutually terminated the Servier Agreement.

Pursuant to the Servier Agreement, we had developed certain allogeneic CAR T candidates, including PBCAR0191 and the stealth cell PBCAR19B, each targeting CD19, as well as four additional product targets (“Servier Targets”). Pursuant to the Program Purchase Agreement, we regained full global rights to research, develop, manufacture and commercialize products resulting from such programs, with sole control over all activities. Additionally, per the terms of the Program Purchase Agreement we do not have an obligation to continue development of the Servier Targets. With respect to products directed to CD19, Servier has certain rights of negotiation, which may be exercised during a specified time period if we elect to initiate a process or entertain third party offers for partnering such products.

Pursuant to the terms of the Program Purchase Agreement, we made a payment of $1.25 million in cash to Servier and agreed to waive earned milestones totaling $18.75 million that would have been otherwise payable to us.

The Program Purchase Agreement also requires us to make certain payments to Servier based on the achievement of regulatory and commercial milestones for each product, and a low- to mid-single-digit percentage royalty (subject to certain reductions) based on net sales of approved products, if any, resulting from any continued development and commercialization of the programs by us, for a period not to exceed ten years after first commercial sale of the applicable product in the United States or certain countries in Europe. If we enter into specified product partnering transactions, the Program Purchase Agreement requires us to pay to Servier a portion of certain consideration received pursuant to such product partnering transactions in lieu of the foregoing milestones (with the exception of a one-time clinical phase development milestone) and royalties. For additional discussion of accounting for payment obligations arising from the Program Purchase Agreement, refer to Note 7 to the consolidated financial statements, “Commitments and Contingencies.”

Gilead

In July 2020, Gilead Sciences (“Gilead”) notified us of its termination of the collaboration and license agreement dated September 10, 2018, subsequently amended by Amendment No. 1 dated March 10, 2020 or (the “Gilead Agreement”), to develop genome editing tools using ARCUS to target viral DNA associated with the Hepatitis B virus. Pursuant to the termination notice, the Gilead Agreement terminated on September 4, 2020. Upon termination, we regained full rights and all data we generated for the *in vivo* chronic HBV program developed under the Gilead Agreement.

Duke University

In April 2006, we entered into the Duke License, pursuant to which Duke University ("Duke") granted us an exclusive (subject to certain non-commercial rights reserved by Duke), sublicensable, worldwide license under certain patents related to certain meganucleases and methods of making such meganucleases owned by Duke to develop, manufacture, use and commercialize products and processes that are covered by such patents, in all fields and in all applications. The patents that we license pursuant to the Duke License have been generated through the use of U.S. government funding and are therefore subject to certain federal regulations. See Part I. Item 1A. *"Risk Factors— Risks Related to Intellectual Property— Some of our in-licensed intellectual property has been discovered through government funded research and thus may be subject to federal regulations such as "march-in" rights, certain reporting requirements and a preference for U.S.-based companies, and compliance with such regulations may limit our exclusive rights and our ability to contract with foreign manufacturers."*

Under the Duke License, in addition to upfront licensing fees, we are also required to pay Duke (1) a total of $0.3 million in milestone payments, a portion of which we paid upon the completion of our Series A financing, a further portion of which we paid upon our first signed partnership in excess of $1 million, and the remainder of which we will be required to pay upon successful commercialization of human therapeutics, (2) royalties in the low single digit percentages on net sales of licensed products and licensed processes sold by us and our affiliates, subject to certain reductions in certain circumstances, with certain annual minimum royalties, and (3) certain percentages of sublicensing revenue received under sublicenses granted to third parties, which are creditable against annual minimum royalties and are subject to certain reductions in certain circumstances. For sublicenses of non-commercial products, the percentage of sublicensing revenue payable to Duke is in the mid-teen percentages for sublicense revenues owed from royalties received and low double-digits for sublicense revenues owed from non-royalty payments. For sublicenses of commercial products created by us and derivatives thereof, the percentage is determined by the highest negotiated royalty rate in such sublicense. If the highest negotiated royalty rate between us and our sublicensee exceeds a mid-single digit percentage, the percentage of sublicensing revenue payable to Duke will be high single digit, decreasing to low single digit as the highest negotiated royalty rate in such sublicense increases.

The Duke License will expire upon the expiration of the last-to-expire patent that is licensed to us. We may terminate the Duke License by providing advance written notice as specified in the Duke License. Either party may terminate the Duke License in the event of the other party's uncured material breach or for the other party's fraud, willful misconduct or illegal conduct with respect to the subject matter of the Duke License.

Tiziana

In September 2021, we entered into the Tiziana Agreement to evaluate foralumab as a lymphodepleting agent in conjunction with our allogeneic CAR T cells for the potential treatment of cancers. We intend to investigate foralumab first in combination with an anti-CD19 CAR T and plan an IND update in 2022 to enable combination use.

SpringWorks Therapeutics

In September 2020, we entered into a Clinical Trial Collaboration Agreement with SpringWorks. Pursuant to such agreement, PBCAR269A will be evaluated in combination with nirogacestat, SpringWorks' investigational GSI, in patients with R/R multiple myeloma. Under the terms of the agreement, we will bear all costs with the conduct of the clinical trial including providing PBCAR269A for use in the trial, and SpringWorks is responsible for providing nirogacestat at its sole cost and expense. The first patient was dosed in the combination arm in June 2021.

Trustees of the University of Pennsylvania

In January 2018, we entered into a research, collaboration and license agreement with the Trustees of the University of Pennsylvania ("Penn") to collaborate on the preclinical development for gene editing products involving the delivery of an ARCUS nuclease. In April 2020, both parties agreed to coordinate a wind-down of all activities in their entirety under the agreement, effective as of June 2020, however, in August 2020 and subsequently in January 2021, both parties agreed to extend certain portions of the agreement through 2022. We will not be required to make termination payments to Penn.

Cellectis S.A.

In January 2014, we entered into a cross-license agreement with Cellectis S.A., which we refer to as the Cellectis License, in connection with a settlement of litigation matters (1) between Cellectis and us and (2) among Cellectis, Duke and us. Cellectis granted us a non-exclusive, sublicensable, worldwide, fully paid, royalty-free license to certain modified I-CreI homing endonuclease patents and Cellectis patents asserted in the litigation, to make, use and commercialize modified I-CreI homing nucleases and products developed using such nucleases, in all fields. The license we received from Cellectis is subject to the rights of a preexisting license agreement that Cellectis entered into with a third party, and the license granted to us excludes any rights exclusively granted by Cellectis under such preexisting license, which preexisting license is limited to certain specific applications unrelated to the fields of human therapeutics, for so long as the rights under the preexisting license remain exclusive.

We granted Cellectis a non-exclusive, sublicensable, worldwide, fully paid-up, royalty-free license to certain modified I CreI homing endonuclease patents and our patents asserted in the litigation matters (1) between Cellectis and us and (2) among Cellectis, Duke and us to make, use and commercialize modified I-CreI homing nucleases and products developing using such nucleases, in all fields except those for which we did not receive rights from Cellectis due to the preexisting license.

The Cellectis License will expire upon the expiration of the last-to-expire valid claim of all of the patents licensed to or from each of the parties to the agreement. Either party may terminate any of the licenses granted under the agreement (1) in the event of the other party's material breach, subject to an opportunity to cure within the time period specified in the Cellectis License, or (2) if the other party directly or indirectly challenges a patent licensed to it by the other party.

Competition

As a diversified life sciences company, we compete in multiple different fields. The biotechnology and pharmaceutical industries are characterized by rapidly advancing technologies, intense competition and a strong emphasis on intellectual property and proprietary products. We principally compete with others developing and utilizing genome editing technology in the human health sector, including companies such as Allogene Therapeutics, Inc., Alnylam Pharmaceuticals, Inc., Beam Therapeutics, Inc., Caribou Biosciences, Inc., Celgene Corp., Cellectis S.A., CRISPR Therapeutics, AG, Editas Medicine, Inc., Intellia Therapeutics, Inc., Sangamo Therapeutics, Inc., and Verve Therapeutics, Inc.

We compete with many biotechnology and pharmaceutical companies, academic research institutions, governmental agencies and public and private research institutions. We expect that our operations focused on CAR T cell product candidate development and commercialization will face substantial competition from those focusing on immunotherapy solutions. Several companies, including Novartis Pharmaceuticals Corp. and Gilead Sciences, Inc. have obtained FDA approval for autologous immunotherapies, and a number of companies, including Cellectis S.A., Celgene Corp., Allogene Therapeutics and CRISPR Therapeutics AG, are pursuing allogeneic immunotherapies. We expect that our operations focused on developing products for *in vivo* treatment of genetic disease will face substantial competition from others focusing on gene therapy treatments, especially those that may focus on conditions that our product candidates target. Moreover, any human therapeutics products that we may develop will compete with existing standards of care for the diseases and conditions that our product candidates target and other types of treatments, such as small molecule, antibody or protein therapies.

Many of our current or potential competitors in the therapeutics space, either alone or with their collaboration partners, have significantly greater financial resources and expertise in research and development, manufacturing, preclinical testing, conducting clinical trials and marketing approved products than we do. In addition to competing on the bases of safety, efficacy, timing of development and commercialization, convenience, cost, availability of reimbursement and rate of adoption of potential product candidates, we may also compete with these competitors in recruiting and retaining qualified personnel, establishing clinical sites, establishing relationships with collaborators or other third parties, registering patients for clinical trials and acquiring technologies complementary to, or necessary for, our product development platforms. Our commercial opportunity could be reduced or eliminated if our competitors develop and commercialize products that are safer, more effective, have fewer or less severe side effects, are more convenient or are less expensive than any products that we may develop. Our competitors also may obtain FDA or other regulatory approval for their products more rapidly than we may obtain approval for ours, which could result in our competitors establishing a strong market position before we are able to enter the market.

Furthermore, we rely upon a combination of patents and trade secret protection, as well as license and confidentiality agreements to protect the intellectual property related to our proprietary technologies, product candidate development programs and product candidates. Our success depends in large part on our ability to secure and maintain patent protection in the United States and other countries with respect to the ARCUS nucleases used in our existing allogeneic CAR T immunotherapy and *in vivo* gene correction programs, as well as any future product candidates. Moreover, the industries in which we operate are characterized by the existence of large numbers of patents and frequent allegations of patent infringement. If, therefore, we are unable to obtain and maintain patent protection for our technology and product candidates, or if the scope of the patent protection obtained or in-licensed is not sufficiently

broad or if the validity of such patent protection is threatened, we may not be able to compete effectively, as it could create opportunities for competitors to enter the market or dissuade other companies from collaborating with us to develop products and technology, any of which would hurt our competitive position and could impair our ability to successfully commercialize our product candidates in any indication for which they are approved.

Intellectual property

Our success depends in part on our abilities to (1) obtain and maintain proprietary protection for ARCUS, (2) defend and enforce our intellectual property rights, in particular, our patent rights, (3) preserve the confidentiality of our know-how and trade secrets, and (4) operate without infringing valid and enforceable intellectual property rights of others. We seek to protect our proprietary position by, among other things, exclusively licensing U.S. and certain foreign patent applications, and filing U.S. and certain foreign patent applications related to ARCUS, existing and planned programs, and improvements that are important to the development of our business. We also rely on trademarks, trade secrets, know-how, continuing technological innovation and confidential information, and the pursuit of licensing opportunities, to develop and maintain our proprietary position and protect aspects of our business that are not amenable to, or that we do not consider appropriate for, patent protection. We seek to protect our proprietary technology and processes, in part, by confidentiality agreements and invention assignment agreements with our employees, consultants, scientific advisors, contractors and others who may have access to proprietary information, under which they are bound to assign to us inventions made during the term of their employment or term of service. We also seek to preserve the integrity and confidentiality of our data and trade secrets by maintaining physical security of our premises and physical and electronic security of our information technology systems.

We cannot be sure that patents will be granted with respect to any patent applications we have licensed or filed or may license or file in the future, and we cannot be sure that any patents we have licensed or which have been granted to us, or patents that may be licensed or granted to us in the future, will not be challenged, invalidated or circumvented or that such patents will be commercially useful in protecting our technology. Moreover, trade secrets can be difficult to protect. While we have confidence in the measures we take to protect and preserve our trade secrets, such measures can be breached, and we may not have adequate remedies for any such breach. In addition, our trade secrets may otherwise become known or be independently discovered by competitors. For more information regarding the risks related to our intellectual property, see Part I. Item 1A. "*Risk Factors—Risks Related to Intellectual Property.*"

Our patent portfolio consists of a combination of issued patents and pending patent applications that are owned by us or licensed by us from third parties. As of December 31, 2021, we have an exclusive license from Duke under 12 issued U.S. patents and two pending U.S. patent applications. In addition, as of December 31, 2021, we own 42 issued U.S. patents, 29 pending non-provisional U.S. patent applications, and 17 pending Patent Cooperation Treaty ("PCT") international patent applications. We also exclusively license from Duke or own many corresponding patents and patent applications outside the United States, as described below. We intend to pursue, when possible, additional patent protection, including composition of matter, method of use and process claims, related to ARCUS. We also intend to obtain rights to existing delivery technologies through one or more licenses from third parties.

ARCUS Platform Patent Families

We license one patent family from Duke and own three patent families that are directed to the core technologies employed in our ARCUS platform for nuclease design. Thus, each of our product candidates is protected by one or more patents in these families.

The first family, licensed from Duke, includes 12 issued U.S. patents, nine issued European patents, three issued Japanese patents, and one issued patent in each of Australia and Canada. This family also includes pending patent applications in each of the United States, Europe, Canada, and two pending patent applications in Japan. Patents in this family include claims directed to (1) recombinant meganucleases having altered cleavage specificity, altered heterodimer formation, and/or altered DNA binding affinity, (2) methods for cleaving target recognition sites in DNA using such meganucleases, and (3) methods for producing genetically modified eukaryotic cells using such meganucleases. Patents in this family have a standard expiration date of October 18, 2026, subject to potential extensions.

The second family, which we own, includes four issued U.S. patents, three issued patents in Europe, two issued patents in Japan, and one issued patent in Australia. This family also includes pending patent applications in each of the United States, Europe, Japan, and Australia. Patents in this family include claims directed to (1) recombinant single-chain meganucleases, and (2) methods for producing isolated genetically modified eukaryotic cells using such meganucleases. Patents in this family have a standard expiration date of October 31, 2028, subject to potential extensions.

The third family, which we own, includes three issued patents in the United States, and two issued patents in each of Europe and Australia. This family also includes pending patent applications in each of the United States and Europe. Patents in this family include

claims directed to methods of cleaving DNA at specific four base pair sites using a recombinant meganuclease. Patents in this family have a standard expiration date of July 14, 2029, subject to potential extensions.

The fourth family, which we own, includes a pending PCT international patent application and pending patent applications in each of the United States, Europe, Australia, Canada, China, Israel, Japan, South Korea, and Mexico. Patent applications in this family include claims directed to recombinant meganucleases engineered to cleave recognition sequences having specific four base pair sites. Patents in this family, if issued, will have a standard expiration date of May 7, 2040, subject to potential extensions.

Immunotherapy Patent Families

We own 23 patent families that are directed to immunotherapy, including CAR T cell therapies. Some of these are applicable to immunotherapies and/or CAR T cells directed to killing a variety of different types of infected or cancerous cells. Others are directed to specific indications in which cells expressing particular antigens are targeted, or methods of manufacturing immunotherapies. Each of our immunotherapy product candidates is protected by one or more patents in these families.

The first family includes nine issued U.S. patents, one issued patent in each of Europe, Australia, Israel, Hong Kong, and Japan, pending patent applications in each of the United States, Europe, Australia, Canada, China, Hong Kong, Japan, Mexico, and South Korea, and two pending patent applications in Israel. Patents in this family include claims directed to (1) populations of genetically modified human T cells in which 20%-65% of the cells have reduced expression of an endogenous TCR and express an anti-cancer antigen CAR from DNA inserted into the cells' TCR alpha constant region (TRAC) gene, (2) methods for using such populations of genetically modified human T cells for cancer immunotherapy, (3) pharmaceutical compositions comprising such populations of genetically modified human T cells, (4) genetically modified human T cells which have reduced expression of an endogenous TCR and express an anti-cancer antigen CAR from DNA inserted into the cells' TRAC gene, (5) methods for using such genetically modified human T cells for cancer immunotherapy, and (6) pharmaceutical compositions comprising such genetically modified human T cells. Patents in this family have a standard expiration date of October 5, 2036, subject to potential extensions.

The second family includes one issued patent in each of the United States, Australia, Hong Kong, and Japan, two issued patents in Europe, pending patent applications in each of the United States, Europe, Australia, Canada, and Japan. Patent applications in this family include claims directed to (1) first-generation recombinant meganucleases that cleave a target in the TRAC gene, (2) nucleic acids and vectors encoding such recombinant meganucleases, (3) methods for producing genetically modified eukaryotic cells, including CAR T cells, using such meganucleases, and (4) methods of using such genetically modified eukaryotic cells for cancer immunotherapy. Patents in this family will have a standard expiration date of October 5, 2036, subject to potential extensions.

The third family pending patent applications in each of the United States, Europe, Australia, Canada, China, Israel, Japan, Mexico, and South Korea. Patent applications in this family include claims directed to (1) second-generation engineered meganucleases that cleave a specific target in the TRAC gene, (2) nucleic acids and vectors encoding such recombinant meganucleases, (3) methods for producing genetically modified eukaryotic cells, including CAR T cells, using such meganucleases, (4) genetically modified eukaryotic cells or populations of cells prepared by such methods, (5) pharmaceutical compositions comprising such cells or populations of cells, and (6) methods of treating diseases using such cells, populations of cells or pharmaceutical compositions to treat diseases, including cancer immunotherapy. Patents in this family, if issued, will likely have a standard expiration date of April 11, 2039, subject to potential extensions.

The fourth family includes one issued patent in each of the United States, Europe, Australia, Hong Kong, and Japan, pending patent applications in Europe, Australia, Canada, Hong Kong, and Japan, and two pending patent applications in the United States. Patent applications in this family include claims directed to (1) nucleic acids encoding co-stimulatory domains having certain amino acid sequences, (2) recombinant DNA constructs and vectors comprising such nucleic acids, (3) nucleic acids and vectors encoding such recombinant meganucleases, (4) genetically modified cells comprising such nucleic acids, (5) methods for producing such genetically modified cells, (6) pharmaceutical compositions comprising such cells, and (7) methods of immunotherapy using such cells. Patents in this family have a standard expiration date of October 4, 2037, subject to potential extensions.

The fifth family includes pending patent applications in the United States and Europe. Patent applications in this family include claims directed to (1) methods of reducing cytotoxicity associated with DNA transfection in primary eukaryotic cells, (2) methods for increasing the number of gene-edited primary eukaryotic cells following DNA transfection, (3) methods for increasing gene editing frequency in primary eukaryotic cells following DNA transfection, (4) methods for increasing the number of primary eukaryotic cells comprising targeted insertion of an exogenous sequence of interest into the genome following DNA transfection, (5) methods for increasing insertion frequency of an exogenous sequence of interest into the genome in primary eukaryotic cells following DNA transfection, (6) methods for high throughput screening of primary human T cells expressing a CAR or exogenous TCR, (7) methods for high throughput screening of primary human T cells expressing a CAR or exogenous TCR, and (8) genetically modified primary eukaryotic cells produced by such methods. Patents in this family, if issued, will have a standard expiration date of April 30, 2038, subject to potential extensions.

The sixth family includes one issued patent in each of Europe and Japan, and pending patent applications in the United States, Europe, Australia, Canada and Japan. Patent applications in this family include claims directed to (1) recombinant meganucleases that recognize and cleave a recognition sequence within the human β2m gene, (2) nucleic acids and vectors encoding such recombinant meganucleases, (3) methods for producing genetically modified eukaryotic cells, including CAR T cells, using such meganucleases, (4) populations of genetically modified eukaryotic cells in which 80% of the cells have reduced expression of an endogenous TCR and 80% of the cells have reduced expression of β2m, (5) pharmaceutical compositions comprising such populations of genetically modified eukaryotic cells, and (6) methods for using such genetically modified eukaryotic cells for cancer immunotherapy. Patents in this family, if issued, will have a standard expiration date of December 22, 2036, subject to potential extensions.

The seventh family includes one issued patent in the United States, and pending patent applications in the United States, Europe, Australia, Canada, Hong Kong, and Japan. Patent applications in this family include claims directed to (1) nucleic acids encoding an engineered antigen receptor (e.g., a CAR) and an inhibitory molecule (e.g., an RNA interfering with β2m expression), (2) genetically modified eukaryotic cells comprising such nucleic acids, (3) methods for producing such genetically modified eukaryotic cells using such nucleic acids and an engineered nuclease that promotes insertion of such nucleic acids, (4) genetically modified eukaryotic cells expressing an engineered antigen receptor and having expression of β2m or MHC Class I molecules reduced by 10%-95%, (5) pharmaceutical compositions comprising such genetically modified eukaryotic cells, and (6) methods for using such genetically modified eukaryotic cells for immunotherapy. Patents in this family have a standard expiration date of May 8, 2038, subject to potential extensions.

The eighth family includes one issued patent in the United States, and pending patent applications in the United States, Europe, Australia, Canada, Hong Kong, and Japan. Patent applications in this family include claims directed to (1) engineered meganucleases that recognize and cleave a recognition sequence in an upstream intron of the human TRAC gene, (2) nucleic acids and vectors encoding such engineered meganucleases, (3) methods for producing genetically modified T cells using such nucleic acids or vectors, (4) genetically modified T cells in which an exogenous sequence is inserted into an upstream intron of the human TRAC gene and endogenous TCR expression is reduced, (5) populations of such genetically modified T cells, (6) pharmaceutical compositions comprising such genetically modified T cells, and (7) methods of treating disease using such genetically modified T cells and pharmaceutical compositions, including cancer immunotherapy. Patents in this family, if issued, will have a standard expiration date of June 27, 2038, subject to potential extensions.

The ninth family includes pending patent applications in the United States and Europe. Patent applications in this family include claims directed to (1) nucleic acids and vectors encoding certain modified human epidermal growth factor receptor, or EGFRs, (2) genetically modified cells and populations of cells, including T cells and CAR T cells, expressing such modified EGFRs, (3) methods for producing such genetically modified cells using such nucleic acids or vectors encoding such modified EGFRs, (4) pharmaceutical compositions comprising such genetically modified cells, (5) methods for isolating such genetically modified cells, (6) methods of treating disease using such genetically modified cells and pharmaceutical compositions, including cancer immunotherapy, and (7) methods of depleting such genetically modified cells in a subject using anti-modified EGFR antibodies. Patents in this family, if issued, will likely have a standard expiration date of October 3, 2038, subject to potential extensions.

The tenth family includes a pending PCT international patent application, and pending patent applications in the United States, Europe, and Canada. Patent applications in this family include claims directed to (1) methods for preparing genetically-modified immune cells, (2) populations of genetically-modified immune cells, (3) pharmaceutical compositions comprising such populations of genetically-modified immune cells, (4) methods of treating a disease using such populations of genetically-modified immune cells, (5) lipid nanoparticle compositions, and (6) kits for transfecting a eukaryotic cell with mRNA. Patents in this family, if issued, will have a standard expiration date of April 3, 2040, subject to potential extensions.

The eleventh family includes two issued patents in the United States, a pending PCT international patent application, and pending patent applications in the United States, Europe, Australia, Canada, China, Israel, Japan, Mexico, and South Korea. Patent applications in this family include claims directed to (1) a genetically-modified immune cell comprising in its genome a nucleic acid sequence encoding a microRNA-adapted shRNA, (2) a method for reducing the expression of an endogenous protein in an immune cell, (3) immune cells made by such methods, (4) populations of such immune cells, (5) pharmaceutical compositions comprising such populations of immune cells, and (6) methods of immunotherapy for treating a disease in a subject. Patents in this family, if issued, will have a standard expiration date of April 3, 2040, subject to potential extensions.

The twelfth family includes a pending PCT international patent application. Patent applications in this family include claims directed to methods of immunotherapy comprising administering to a subject a CD3 antibody, or antigen binding fragment thereof, that binds CD3 for the purpose of lymphodepletion, in combination with the administration of genetically-modified T cells that do not have detectable CD3 expression on the cell surface. Patents in this family, if issued, will have a standard expiration date of August 20, 2040, subject to potential extensions.

The thirteenth family includes a pending PCT international patent application. Patent applications in this family include claims directed to (1) polynucleotides encoding a CD20-specific chimeric antigen receptor, (2) methods of producing a genetically-modified T cell comprising such polynucleotides, (3) a genetically-modified T cell comprising such polynucleotides, (4) populations of such genetically-modified T cells, (5) pharmaceutical compositions comprising such genetically-modified T cells or populations, and (6) methods of immunotherapy for treating cancer in a subject. Patents in this family, if issued, will have a standard expiration date of October 30, 2040, subject to potential extensions.

The fourteenth family includes a pending PCT international patent application. Patent applications in this family include claims directed to a method of immunotherapy for treating cancer in a subject. Patents in this family, if issued, will have a standard expiration date of December 3, 2040, subject to potential extensions.

The fifteenth family includes a pending PCT international patent application. Patent applications in this family include claims directed to methods for reducing the number of target cells, such as cancer cells, in a subject. Patents in this family, if issued, will have a standard expiration date of May 14, 2041, subject to potential extensions.

The sixteenth family includes a pending PCT international patent application. Patent applications in this family include claims directed to a method for reducing the number of target cells, such as cancer cells, in a subject. Patents in this family, if issued, will have a standard expiration date of May 14, 2041, subject to potential extensions.

The seventeenth family includes a pending PCT international patent application. Patent applications in this family include claims directed to (1) an isolated antibody, or antigen-binding fragment thereof, that specifically binds to BCMA, (2) a pharmaceutical composition comprising such an antibody, (3) a polynucleotide encoding such an antibody, and an expression vector comprising the same, (5) a method of treating cancer in a subject, (6) a polynucleotide comprising a nucleic acid sequence encoding a chimeric antigen receptor having an anti-BCMA binding domain, (7) a genetically-modified eukaryotic cell comprising such a polynucleotide, (8) a method for producing such a genetically-modified eukaryotic cell, (9) a population of such genetically-modified eukaryotic cells, (10) a pharmaceutical composition comprising such a population, and (11) a method for treating cancer in a subject. Patents in this family, if issued, will have a standard expiration date of August 10, 2041, subject to potential extensions.

The eighteenth family includes a pending PCT international patent application. Patent applications in this family include claims directed to (1) a lipid nanoparticle composition, (2) a method for transfecting a population of eukaryotic cells, (3) a method for introducing a nucleic acid into a population of eukaryotic cells, (4) a population of such eukaryotic cells, (5) a pharmaceutical composition comprising such a population, and (6) a method for reducing the number of target cells in a subject. Patents in this family, if issued, will have a standard expiration date of October 6, 2041, subject to potential extensions.

We own five additional patent families that include pending provisional patent applications in the United States that are directed to immunotherapies, including CAR T cell therapies, or to technologies that are useful for the manufacture of immunotherapies. We jointly own one patent family that includes a pending PCT international patent application directed to immunotherapies. We jointly own one patent family that includes two pending provisional patent applications in the United States. We will determine in the future whether to pursue each of these applications.

Other Patent Families

We own three patent families directed to gene therapy for HBV. The first family includes two issued patents in each of the United States and Japan, one issued patent in South Korea, pending patent applications in the United States, Europe, Australia, Canada, China, Costa Rica, Columbia, the Dominican Republic, Egypt, Eurasia, Guatemala, Israel, Japan, South Korea, Mexico, Morocco, New Zealand, Peru, the Philippines, Saudi Arabia, South Africa, Thailand, and Vietnam, and two pending patent applications in Hong Kong. Patents in this family will have a standard expiration date of October 13, 2037, subject to potential extensions. The second family includes one issued US patent, and pending patent applications in the United States, Europe, Taiwan and the Gulf Cooperation Council. Patents in this family, if issued, will have a standard expiration date of April 11, 2039, or April 12, 2039, subject to potential extensions. The third family includes a pending PCT international patent application. Patents in this family, if issued, will have a standard expiration date of December 4, 2040, subject to potential extensions.

We own one patent family directed to engineered meganucleases and methods of treatment targeting the PCSK9 gene, which is associated with familial hypercholesterolemia. This family includes pending patent applications in the United States, Europe, Australia, Canada, China, Hong Kong, Israel, Japan, Mexico, and South Korea. Patents in this family, if issued, will have a standard expiration date of April 20, 2038, subject to potential extensions.

We own two patent families directed to engineered meganucleases and methods of treatment targeting the rhodopsin gene, which is associated with retinitis pigmentosa. The first family includes two issued patents in the United States, one issued patent in each of Australia and Japan, and pending patent applications in the United States, Europe, Australia, Canada, and Japan. Patents in this family

will have a standard expiration date of September 8, 2036, subject to potential extensions. The second family includes a pending PCT international patent application. Patents in this family, if issued, will likely have a standard expiration date of May 11, 2041, subject to potential extensions.

We own two patent families that are directed to engineered meganucleases and methods of treatment targeting the hydroxyacid oxidase 1 gene, which is associated with primary hyperoxaluria 1. The first family includes pending patent applications in the United States and Europe. Patents in this family, if issued, will have a standard expiration date of December 20, 2039, subject to potential extensions. The second family includes three pending US provisional patent applications. Patents in this family, if issued, will likely have a standard expiration date of January 8, 2042, subject to potential extensions.

We own two patent families that are directed to engineered meganucleases and methods of treatment targeting the Factor VIII gene, which is associated with Hemophilia A. The first family includes one issued patent in Europe, and pending patent applications in the United States, Europe, Australia, Canada, and Japan. Patents in this family will have a standard expiration date of May 3, 2037, subject to potential extensions. The second family includes pending patent applications in the United States and Europe. Patents in this family, if issued, will have a standard expiration date of November 1, 2038, subject to potential extensions.

We own one patent family directed to engineered meganucleases and methods of treatment targeting the ApoC3 gene, which is associated with diseases resulting from abnormal triglyceride synthesis. This family includes a pending provisional patent application in the United States. Patents in this family, if issued, will likely have a standard expiration date of August 16, 2042, subject to potential extensions.

We own one patent family directed to engineered meganucleases and methods of treatment targeting the transthyretin (“TTR”) gene, which is associated with TTR amyloidosis. This family includes a pending PCT international patent application. Patents in this family, if issued, will have a standard expiration date of August 20, 2041, subject to potential extensions.

We own two patent families directed to engineered meganucleases and methods of treatment targeting the dystrophin gene, which is associated with Duchenne Muscular Dystrophy. The first family includes one issued patent in each of Europe and Japan, and pending patent applications in the United States, Europe, Australia, Canada, and Japan. Patents in this family will have a standard expiration date of March 12, 2035, subject to potential extensions. The second family includes a pending provisional patent application in the United States and a pending PCT international patent application. Patent applications in this family, if issued, will have a standard expiration date of November 12, 2041.

We own one patent family directed to engineered meganucleases and methods of treatment targeting genomic nucleotide repeats, which are associated with several nucleotide repeat disorders. This family includes one issued patent in Europe, and pending patent applications in the United States and Europe. Patents in this family will have a standard expiration date of May 2, 2036, subject to potential extensions.

We own one patent family directed to engineered meganucleases and methods of treating alpha-1 antitrypsin deficiency. This family includes six pending provisional patent applications in the United States. Patents in this family, if issued, will likely have a standard expiration date of October 19, 2042.

We own one patent family directed to engineered meganucleases that target mitochondrial genomes and methods of treating mitochondrial disorders. This family includes four pending provisional patent applications in the United States. Patents in this family, if issued, will likely have a standard expiration date of April 22, 2042.

We jointly own one patent family directed to engineered meganucleases that target mitochondrial genomes and methods of treating mitochondrial disorders. This family includes three pending provisional patent applications in the United States. Patents in this family, if issued, will likely have a standard expiration date of April 22, 2042.

We jointly own one patent family directed to methods for generating male sterile plants. This family includes one pending provisional patent application in the United States. Patents in this family, if issued, will likely have a standard expiration date of April 22, 2042.

We license from Duke one patent family directed to engineered fusion proteins comprising engineered meganuclease domains and effector domains which may be useful in controlling gene expression. This patent family includes one pending patent application in the United States. Patents in this family, if issued, will have a standard expiration date of October 18, 2026, subject to potential extensions.

We own one patent family directed to engineered meganucleases that target amplifiable genetic loci and may be useful in producing cells with amplified transgenes. This family includes two issued patents in Europe, one issued patent in the United States, and pending

patent applications in each of the United States and Europe. Patents in this family will have a standard expiration date of June 1, 2032, subject to potential extensions.

We own two patent families directed to self-limiting viral vectors (e.g., AAV vectors) that encode engineered meganucleases which eliminate the vector after gene delivery. The first family includes one issued patent in the United States, and pending patent applications in each of the United States and Europe. Patents in this family will have a standard expiration date of June 20, 2036, subject to potential extensions. The second family includes one pending PCT international patent application. Patents in this family, if issued, will have a standard expiration date of May 10, 2041, subject to potential extensions.

We own one patent family directed to compositions and methods for sequential stacking of nucleic acid sequences into a genomic locus. This family includes a pending PCT international patent application. Patents in this family, if issued, will have a standard expiration date of July 24, 2040, subject to potential extensions.

We own one patent family directed to eukaryotic cells comprising a modified transferrin gene that includes an exogenous nucleic acid sequence encoding a polypeptide of interest. This family includes pending patent applications in each of the United States and Europe. Patents in this family, if issued, will have a standard expiration date of January 10, 2040, subject to potential extensions.

We own one patent family directed to methods for separation of empty and full AAV capsids during manufacturing. This family includes a pending PCT international patent application. Patents in this family, if issued, will have a standard expiration date of February 5, 2041, subject to potential extensions.

We own an issued patent in the United States directed to engineered meganucleases which target a genetic locus in maize and methods for genetically modifying that locus in maize. That patent has a standard expiration date of March 2, 2029, subject to potential extensions.

For any individual patent, the term depends on the applicable law in the country in which the patent is granted. In most countries where we have filed patent applications or in-licensed patents and patent applications, patents have a term of 20 years from the application filing date or earliest claimed non-provisional priority date. In the United States, the patent term is 20 years but may be shortened if a patent is terminally disclaimed over another patent that expires earlier. The term of a U.S. patent may also be lengthened by a patent term adjustment to address administrative delays by the United States Patent and Trademark Office (the “USPTO”) in granting a patent.

In the United States, the term of a patent that covers an FDA-approved drug or biologic may be eligible for patent term extension in order to restore the period of a patent term lost during the premarket FDA regulatory review process. The Hatch-Waxman Act permits a patent term extension of up to five years beyond the natural expiration of the patent. The patent term restoration period is generally equal to the portion of the FDA regulatory review period for the approved product that occurs after the date the patent issued, subject to certain exceptions. Only one patent may be extended for a regulatory review period for any product, and the application for the extension must be submitted prior to the expiration of the patent. In the future, we may decide to apply for restoration of patent term for one of our currently owned or licensed patents to extend its current expiration date, depending on the expected length of the clinical studies and other factors involved in the filing of the relevant Biologics License Application (“BLA”).

We or our licensors may be subject to claims that former employees, collaborators or other third parties have an interest in our owned or in-licensed patents or other intellectual property as an inventor or co-inventor. If we are required to and unable to obtain an exclusive license to any such third-party co-owners’ interest in such patent applications, such co-owners may be able to license their rights to other third parties, including our competitors. In addition, we may need the cooperation of any such co-owners to enforce any patents that issue from such patent applications against third parties, and such cooperation may not be provided to us. We or our licensors are subject to and may also become a party to similar proceedings or priority disputes in Europe or other foreign jurisdictions.

Our trademark portfolio currently contains two registered trademarks in the United States, including ARCUS and ARC nuclease. We also own registered trademarks for both ARCUS and ARC nuclease in Europe, China and Australia, and a registered trademark for ARCUS in Canada. Additionally, we own pending trademark applications for Precision BioSciences and the Precision BioSciences logo in the United States, Europe, Australia, Canada, China, Japan, and the United Kingdom (“UK”), pending trademark applications for Evade, PBStealth, StealthCAR, and StealthCAR T in the United States, and pending trademark applications for Precision Biotechnology in the United States, Australia, Brazil, Canada, China, Europe, Japan, and Mexico.

Licensed Intellectual Property

Duke University

In April 2006, we exclusively licensed from Duke families of patents and patent applications related to certain meganucleases and methods of making such nucleases owned by Duke. The patent family covered by the Duke License comprises the core patents covering ARCUS described above. See "*—License and Collaboration Agreements—Duke University*" above for additional information regarding the Duke License.

Cellectis S.A.

In January 2014, we entered into the Cellectis License, which relates to certain modified I-CreI homing endonuclease patents and patents that had been subject to litigation between us and Cellectis. The patents to which we have rights under the cross-license include at least eight issued patents in each of the United States and Australia, seven issued patents in Europe, two issued patents in Canada and one issued patent in Japan. These patents have standard expiration dates prior to January 29, 2034, subject to potential extensions. See "*—License and Collaboration Agreements—Cellectis S.A.*" above for additional information regarding the Cellectis License.

Government Regulation

The FDA and other regulatory authorities at federal, state, and local levels, as well as in foreign countries, extensively regulate, among other things, the research, development, testing, manufacture, quality control, import, export, safety, effectiveness, labeling, packaging, storage, distribution, record keeping, approval, advertising, promotion, marketing, post-approval monitoring, and post-approval reporting of biological product candidates such as those we are developing. We, along with third-party contractors, will be required to navigate the various preclinical, clinical and commercial approval requirements of the governing regulatory agencies of the countries in which we wish to conduct studies or seek approval or licensure of our product candidates. The process of obtaining regulatory approvals and the subsequent compliance with appropriate federal, state, local and foreign statutes and regulations require the expenditure of substantial time and financial resources.

U.S. Biologics Regulation

The process required by the FDA before biologic product candidates may be marketed in the United States generally involves the following:

- completion of preclinical laboratory tests and animal studies performed in accordance with the FDA's Good Laboratory Practice requirements;
- demonstration of successful, reproducible manufacture of clinical trial material produced in compliance with cGMPs and consistent with all release specifications for the product at initial manufacture and over time when stored under defined conditions;
- submission to the FDA of an IND, which must become effective before clinical trials may begin, and which must be properly maintained throughout the course of clinical development;
- approval by an Investigational Review Board ("IRB") or ethics committee, and potential additional scientific and biosafety review committees at each clinical site before the trial is commenced;
- performance of adequate and well-controlled human clinical trials following protocols agreed to by FDA to establish the safety and effectiveness of the proposed biologic product candidate for its intended purpose;
- preparation of and submission to the FDA of a BLA after completion of all pivotal clinical trials;
- a determination by the FDA within 60 days of its receipt of a BLA to file the application for review;
- satisfactory completion of an FDA pre-approval inspection of the manufacturing facility or facilities at which the proposed commercial product is produced to assess compliance with cGMP and to assure that the facilities, methods and controls are adequate to preserve the biological product's continued safety, purity and potency, and of selected clinical investigation sites to assess compliance with Good Clinical Practices ("GCPs"); and
- satisfactory completion of an FDA Advisory Committee review, if applicable;
- FDA review and approval of the BLA to permit commercial marketing of the product for particular indications for use in the United States.

Prior to beginning the first clinical trial with a product candidate in the United States, we must submit an IND to the FDA. An IND is a request for authorization from the FDA to administer an investigational new drug product to humans. A central focus of an IND submission is on the general investigational plan and the protocol(s) for clinical studies. The IND also includes results of animal and *in vitro* studies assessing the toxicology, pharmacokinetics, pharmacology, and pharmacodynamic characteristics of the product; chemistry, manufacturing, and controls information; and any available human data or literature to support the use of the investigational product according to the proposed clinical protocol including the proposed dose level(s). An IND must become effective before human clinical trials may begin. The IND automatically becomes effective 30 days after receipt by the FDA, unless the FDA, within the 30-day time period, raises safety concerns or questions about the proposed clinical trial. In such a case, the IND may be placed on clinical hold and the IND sponsor and the FDA must resolve any outstanding concerns or questions before the clinical trial can begin. Submission of an IND therefore may or may not result in FDA authorization to begin a clinical trial.

In addition to the submission of an IND to the FDA before initiation of a clinical trial in the United States, certain human clinical trials involving recombinant or synthetic nucleic acid molecules are subject to oversight of institutional biosafety committees, or IBCs, as set forth in the NIH Guidelines for Research Involving Recombinant or Synthetic Nucleic Acid Molecules, or NIH Guidelines. Specifically, under the NIH Guidelines, supervision of human gene transfer trials includes evaluation and assessment by an IBC, a local institutional committee that reviews and oversees research utilizing recombinant or synthetic nucleic acid molecules at that institution. The IBC assesses the safety of the research and identifies any potential risk to public health or the environment, and such review may result in some delay before initiation of a clinical trial. While the NIH Guidelines are not mandatory unless the research in question is being conducted at or sponsored by institutions receiving NIH funding of recombinant or synthetic nucleic acid molecule research, many companies and other institutions not otherwise subject to the NIH Guidelines voluntarily follow them.

Clinical trials involve the administration of the investigational product to human subjects under the supervision of qualified investigators in accordance with GCPs, which include the requirement that all research subjects provide their informed consent for their participation in any clinical study. Clinical trials are conducted under protocols detailing, among other things, the objectives of the study, the parameters to be used in monitoring safety and the effectiveness criteria to be evaluated. A separate submission to the existing IND must be made for each successive clinical trial conducted during product development and for any subsequent protocol amendments. While the IND is active, progress reports summarizing the results of the clinical trials and nonclinical studies performed since the last progress report, among other information, must be submitted at least annually to the FDA, and written IND safety reports must be submitted to the FDA and investigators for serious and unexpected suspected adverse events, findings from other studies suggesting a significant risk to humans exposed to the drug, findings from animal or in vitro testing suggesting a significant risk to humans exposed to the drug, and any clinically important increased rate of a serious suspected adverse reaction compared to that listed in the protocol or investigator brochure.

Furthermore, for each site proposing to conduct the clinical trial an independent IRB must review and approve the plan for any clinical trial and the informed consent form before the clinical trial begins at that site, and must monitor the study until completed. Regulatory authorities, the IRB, or the sponsor may suspend a clinical trial at any time on various grounds, including a finding that the subjects are being exposed to an unacceptable health risk or that the trial is unlikely to meet its stated objectives. Some studies also include oversight by an independent group of qualified experts organized by the clinical study sponsor, known as a data safety monitoring board, which provides authorization for whether or not a study may move forward at designated check points based on access to certain data from the study and may halt the clinical trial if it determines that there is an unacceptable safety risk for subjects or other grounds, such as no demonstration of efficacy. There are also requirements governing the reporting of ongoing clinical studies and clinical study results to public registries.

For purposes of BLA approval, human clinical trials are typically conducted in three sequential phases that may overlap or be combined:

- Phase 1—The investigational product is initially introduced into healthy human subjects or patients with the target disease or condition. These studies are designed to test the safety, dosage tolerance, absorption, metabolism and distribution of the investigational product in humans, the side effects associated with increasing doses, and, if possible, to gain early evidence on effectiveness.

- Phase 2—The investigational product is administered to a limited patient population with a specified disease or condition to evaluate the preliminary efficacy, optimal dosages and dosing schedule and to identify possible adverse side effects and safety risks. Multiple Phase 2 clinical trials may be conducted to obtain information prior to beginning larger and more expensive Phase 3 clinical trials.

- Phase 3—The investigational product is administered to an expanded patient population to further evaluate dosage, to provide statistically significant evidence of clinical efficacy and to further test for safety, generally at multiple geographically dispersed clinical trial sites. These clinical trials are intended to establish the overall risk/benefit ratio of the investigational product and to provide an adequate basis for product approval.

- Phase 4—In some cases, the FDA may require, or companies may voluntarily pursue, additional clinical trials after a product is approved to gain more information about the product. These so-called Phase 4 studies may be made a condition to approval of the BLA.

Development of new treatments for cancer and genetic diseases often combine phase 1 and phase 2 trials as the treatment is studied in limited patient population with the specified disease. Concurrent with clinical trials, companies may complete additional animal studies and develop additional information about the biological characteristics of the product candidate, and must finalize a process for manufacturing the product in commercial quantities in accordance with cGMP. The manufacturing process must be capable of consistently producing quality batches of the product candidate and, among other things, must develop methods for testing the identity, strength, potency, quality and purity of the final product, or for biologics, the safety, purity and potency. Additionally, appropriate packaging must be selected and tested and stability studies must be conducted to demonstrate that the product candidate does not undergo unacceptable deterioration over its shelf life.

BLA Submission and Review by the FDA

Assuming successful completion of all required testing in accordance with all applicable regulatory requirements, the results of product development, nonclinical studies and clinical trials are submitted to the FDA as part of a BLA requesting approval to market the product for one or more indications. The BLA must include all relevant data available from pertinent preclinical and clinical studies, including negative or ambiguous results as well as positive findings, together with detailed information relating to the product's chemistry, manufacturing, controls, and proposed labeling, among other things. Data can come from company-sponsored clinical studies intended to test the safety and effectiveness of a use of the product, or from a number of alternative sources, including studies initiated by investigators. The submission of a BLA requires payment of a substantial user fee to FDA, and the sponsor of an approved BLA is also subject to an annual program fee. These fees are typically increased annually. A waiver of user fees may be obtained under certain limited circumstances. Additionally, no user fees are assessed on BLAs for products designated as orphan drugs, unless the application also includes a non-orphan indication.

Within 60 days following submission of the application, the FDA reviews all NDAs and BLAs submitted to ensure that they are sufficiently complete for substantive review before it accepts them for filing. The FDA may request additional information rather than accept an NDA or BLA for filing. In this event, the NDA or BLA must be resubmitted with the additional information. The resubmitted application also is subject to review before the FDA accepts it for filing. Once a BLA has been accepted for filing, the FDA begins an in-depth substantive review. The FDA reviews a BLA to determine, among other things, whether a product is safe, pure and potent and the facility in which it is manufactured, processed, packed, or held meets standards designed to assure the product's continued safety, purity, and potency. The FDA's goal is to review standard applications within ten months after it accepts the application for filing, or, if the application qualifies for priority review, six months after the FDA accepts the application for filing. Priority review designation will direct overall attention and resources to the evaluation of applications for product candidates that, if approved, would represent significant improvements in the safety or effectiveness of the treatment, diagnosis, or prevention of serious conditions. In both standard and priority reviews, the review process is often significantly extended by FDA requests for additional information or clarification. The FDA may convene an advisory committee to provide clinical insight on application review questions. Before approving a BLA, the FDA will typically inspect the facility or facilities where the product is manufactured. The FDA will not approve an application unless it determines that the manufacturing processes and facilities are in compliance with cGMP and adequate to assure consistent production of the product within required specifications. Additionally, before approving a BLA, the FDA will typically inspect one or more clinical sites involved in the pivotal studies submitted in the BLA to assure compliance with GCP.

After the FDA evaluates a BLA and conducts inspections of manufacturing facilities where the investigational product and/or its drug substance will be produced, the FDA may issue an approval letter or a Complete Response Letter ("CRL") if the FDA determines that the application, manufacturing process or manufacturing facilities are not acceptable. In the CRL, the FDA will outline the deficiencies in the BLA submission and often will request additional information or testing that the applicant might perform to place the BLA in condition for approval, including requests for additional information or clarification. Notwithstanding the submission of any requested additional information, the FDA ultimately may decide that the application does not satisfy the regulatory criteria for approval. Note that where the FDA determines that the data supporting the application are inadequate to support approval, the FDA may issue the CRL without first conducting required inspections, testing submitted product lots, and/or reviewing proposed labeling. The FDA may delay or refuse approval of a BLA if applicable regulatory criteria are not satisfied, require additional testing or information and/or require post-marketing testing and surveillance to monitor safety or efficacy of a product.

If regulatory approval of a product is granted, such approval will be granted for particular indications and may entail limitations on the indicated uses for which such product may be marketed. For example, the FDA may approve the BLA with the requirement that a Risk Evaluation and Mitigation Strategy ("REMS") be established to ensure the benefits of the product outweigh its risks when used according to the approved label. A REMS is a safety strategy to manage a known or potential serious risk associated with a medicine and to enable patients to have continued access to such medicines by managing their safe use, and could include medication guides, physician communication plans, or elements to assure safe use, such as restricted distribution methods, patient registries, required prescriber training, and other risk minimization tools. The FDA also may condition approval on, among other things, changes to proposed labeling or the development of adequate controls and specifications. Once approved, the FDA may withdraw the product approval if compliance with pre- and post-marketing requirements is not maintained or if problems occur after the product reaches the marketplace. The FDA may require one or more Phase IV post-market studies and surveillance to further assess and monitor the product's safety and effectiveness after commercialization, and may limit further marketing of the product based on the results of these post-marketing studies. In addition, new government requirements, including those resulting from new legislation, may be established, or the FDA's policies may change, which could impact the timeline for regulatory approval or otherwise impact ongoing development programs.

In addition, the Pediatric Research Equity Act ("PREA") requires a sponsor to conduct pediatric clinical trials for most biologics, for a new active ingredient, new indication, new dosage form, new dosing regimen or new route of administration. Under PREA, BLAs and supplements thereto must contain a pediatric assessment unless the sponsor has received a deferral or waiver. The required assessment must evaluate the safety and effectiveness of the product for the claimed indications in all relevant pediatric subpopulations and support dosing and administration for each pediatric subpopulation for which the product has been determined safe and effective. The sponsor or FDA may request a deferral of pediatric clinical trials for some or all of the pediatric subpopulations. A deferral may be granted for several reasons, including a finding that the biologic is ready for approval for use in adults before pediatric clinical trials are complete or that additional safety or effectiveness data needs to be collected before the pediatric clinical trials begin. The FDA must send a noncompliance letter to any sponsor that fails to submit the required assessment, keep a deferral current or fails to submit a request for approval of a pediatric formulation.

Expedited Development and Review Programs

A sponsor may seek approval of its product candidate under programs designed to accelerate FDA's review and approval of new drugs and biological products that meet certain criteria. Specifically, new drugs and biological products are eligible for fast track designation if they are intended to treat a serious or life-threatening disease or condition and demonstrate the potential to address unmet medical needs for the disease or condition. For a fast track product candidate, the FDA may consider sections of the BLA for review on a rolling basis before the complete application is submitted, if the sponsor provides a schedule for the submission of the sections of the application, the FDA agrees to accept sections of the application and determines that the schedule is acceptable and the sponsor pays any required user fees upon submission of the first section of the application. A fast track designated product candidate may also qualify for priority review, under which the FDA sets the target date for FDA action on the BLA at six months after the FDA accepts the application for filing. Priority review is granted pending availability of FDA review resources for the expedited review and when there is evidence that the proposed product would be a significant improvement in the safety or effectiveness of the treatment, diagnosis, or prevention of a serious disease or condition.

A product candidate intended to treat a serious or life-threatening disease or condition may also be eligible for breakthrough therapy designation to expedite its development and review. A product candidate can receive breakthrough therapy designation if preliminary clinical evidence indicates that the product candidate, alone or in combination with one or more other drugs or biologics, may demonstrate substantial improvement over existing therapies on one or more clinically significant endpoints, such as substantial treatment effects observed early in clinical development. The designation includes all of the fast track program features, as well as more intensive FDA interaction and guidance beginning as early as Phase 1 and an organizational commitment to expedite the development and review of the product candidate, including involvement of senior managers.

Any product candidate submitted to the FDA for approval, including a product with a fast track designation or breakthrough therapy designation, may also be eligible for other types of FDA programs intended to expedite development and review, such as accelerated approval. Under the accelerated approval program, the FDA may approve a BLA on a determination that the biologic has an effect on either a surrogate endpoint that is reasonably likely to predict clinical benefit, or on a clinical endpoint that can be measured earlier than irreversible morbidity or mortality, that is reasonably likely to predict an effect on irreversible morbidity or mortality or other clinical benefit, taking into account the severity, rarity, or prevalence of the condition and the availability or lack of alternative treatments. Post-marketing studies or completion of ongoing studies after marketing approval are generally required to verify the biologic's clinical benefit in relationship to the surrogate endpoint or ultimate outcome in relationship to the clinical benefit. In addition, the FDA currently requires as a condition for accelerated approval pre-approval of promotional materials, which could adversely impact the timing of the commercial launch of the product. FDA may withdraw approval of a drug or indication approved under accelerated approval on an expedited basis if, for example, the confirmatory trial fails to verify the predicted clinical benefit of the product or the sponsor fails to conduct such confirmatory trials in a timely manner.

The Regenerative Medicine Advanced Therapy (“RMAT”), designation facilitates an efficient development program for, and expedites review of, any drug that meets the following criteria: (1) it qualifies as a RMAT, which is defined as a cell therapy, therapeutic tissue engineering product, human cell and tissue product, or any combination product using such therapies or products, with limited exceptions; (2) it is intended to treat, modify, reverse, or cure a serious or life-threatening disease or condition; and (3) preliminary clinical evidence indicates that the drug has the potential to address unmet medical needs for such a disease or condition. Like breakthrough therapy designation, RMAT designation provides potential benefits that include more frequent meetings with FDA to discuss the development plan for the product candidate, and eligibility for rolling review and priority review. Product candidates granted RMAT designation may also be eligible for accelerated approval on the basis of a surrogate or intermediate endpoint reasonably likely to predict long-term clinical benefit, or reliance upon data obtained from a meaningful number of sites, including through expansion to additional sites. RMAT-designated products that receive accelerated approval may, as appropriate, fulfill their post-approval requirements through the submission of clinical evidence, clinical studies, patient registries, or other sources of real world evidence (such as electronic health records); through the collection of larger confirmatory data sets; or via post-approval monitoring of all patients treated with such therapy prior to approval of the therapy.

Fast track designation, priority review, breakthrough therapy designation and RMAT designation do not change the standards for approval but may expedite the development or approval process. Even if a product qualifies for one or more of these programs, the FDA may later decide that the product no longer meets the conditions for qualification or decide that the time period for FDA review or approval will not be shortened.

Orphan Drug Designation and Exclusivity

Under the Orphan Drug Act, the FDA may grant orphan designation to a drug or biologic intended to treat a rare disease or condition, defined as a disease or condition with a patient population of fewer than 200,000 individuals in the United States, or a patient population greater than 200,000 individuals in the United States and when there is no reasonable expectation that the cost of developing and making available the drug or biologic in the United States will be recovered from sales in the United States for that drug or biologic. Orphan drug designation must be requested before submitting a BLA. After the FDA grants orphan drug designation, the generic identity of the therapeutic agent and its potential orphan use are disclosed publicly by the FDA.

If a product that has orphan drug designation subsequently receives the first FDA approval for a particular active ingredient within the product for the disease for which it has such designation, the product is entitled to orphan product exclusivity, which means that the FDA may not approve any other applications, including a full BLA, to market the same active ingredient for the same indication for seven years, except in limited circumstances, such as a showing of clinical superiority to the product with orphan drug exclusivity or if the FDA finds that the holder of the orphan drug exclusivity has not shown that it can assure the availability of sufficient quantities of the orphan drug to meet the needs of patients with the disease or condition for which the drug was designated. Orphan drug exclusivity does not prevent the FDA from approving a different drug or biologic for the same disease or condition, or the same drug or biologic for a different disease or condition. Among the other benefits of orphan drug designation are tax credits for certain research and a waiver of the BLA application user fee.

A designated orphan drug many not receive orphan drug exclusivity if it is approved for a use that is broader than the indication for which it received orphan designation. In addition, orphan drug exclusive marketing rights in the United States may be lost if the FDA later determines that the request for designation was materially defective or, as noted above, if the second applicant demonstrates that its product is clinically superior to the approved product with orphan exclusivity or the manufacturer of the approved product is unable to assure sufficient quantities of the product to meet the needs of patients with the rare disease or condition.

Post-Approval Requirements

Any products manufactured or distributed by us pursuant to FDA approvals are subject to pervasive and continuing regulation by the FDA, including, among other things, requirements relating to record-keeping, reporting of adverse experiences, periodic reporting, product sampling and distribution, and advertising and promotion of the product. After approval, most changes to the approved product, such as adding new indications or other labeling claims, are subject to prior FDA review and approval. There also are continuing, annual program fees for any marketed products. Biologic manufacturers and their subcontractors are required to register their establishments with the FDA and certain state agencies and are subject to periodic unannounced inspections by the FDA and certain state agencies for compliance with cGMP, which impose certain procedural and documentation requirements upon us and our third-party manufacturers. Changes to the manufacturing process are strictly regulated, and, depending on the significance of the change, may require prior FDA approval before being implemented. FDA regulations also require investigation and correction of any deviations from cGMP and impose reporting requirements upon us and any third-party manufacturers that we may decide to use. Accordingly, manufacturers must continue to expend time, money and effort in the area of production and quality control to maintain compliance with cGMP and other aspects of regulatory compliance.

The FDA may withdraw approval if compliance with regulatory requirements and standards is not maintained or if problems occur after the product reaches the market. Later discovery of previously unknown problems with a product, including adverse events of unanticipated severity or frequency, or with manufacturing processes, or failure to comply with regulatory requirements, may result in revisions to the approved labeling to add new safety information; imposition of post-market studies or clinical studies to assess new safety risks; or imposition of distribution restrictions or other restrictions under a REMS program. Other potential consequences include, among other things:

- restrictions on the marketing or manufacturing of the product, complete withdrawal of the product from the market or product recalls;
- fines, warning letters or holds on post-approval clinical studies;
- refusal of the FDA to approve pending applications or supplements to approved applications, or suspension or revocation of product license approvals;
- product seizure or detention, or refusal to permit the import or export of products;
- consent decrees, corporate integrity agreements, debarment or exclusion from federal healthcare programs;
- mandated modification of promotional materials and labeling and the issuance of corrective information;
- the issuance of safety alerts, Dear Healthcare Provider letters, press releases and other communications containing warnings or other safety information about the product; or
- injunctions or the imposition of civil or criminal penalties.

The FDA closely regulates the marketing, labeling, advertising and promotion of biologics. A company can make only those claims relating to safety and efficacy, purity and potency that are approved by the FDA and in accordance with the provisions of the approved label. The FDA and other agencies actively enforce the laws and regulations prohibiting the promotion of off-label uses. Failure to comply with these requirements can result in, among other things, adverse publicity, warning letters, corrective advertising and potential civil and criminal penalties. Physicians may prescribe legally available products for uses that are not described in the product's labeling and that differ from those tested by us and approved by the FDA. Such off-label uses are common across medical specialties. Physicians may believe that such off-label uses are the best treatment for many patients in varied circumstances. The FDA does not regulate the behavior of physicians in their choice of treatments. The FDA does, however, restrict manufacturer's communications on the subject of off-label use of their products.

Biosimilars and Exclusivity

The Affordable Care Act, signed into law in 2010, includes a subtitle called the Biologics Price Competition and Innovation Act of 2009 (the "BPCIA"), which created an abbreviated approval pathway for biological products that are biosimilar to or interchangeable with an FDA-licensed reference biological product. The FDA has issued several guidance documents outlining an approach to review and approval of biosimilars.

Biosimilarity, which requires that there be no clinically meaningful differences between the biological product and the reference product in terms of safety, purity, and potency, can be shown through analytical studies, animal studies, and a clinical study or studies. Interchangeability requires that a product is biosimilar to the reference product and the product must demonstrate that it can be expected to produce the same clinical results as the reference product in any given patient and, for products that are administered multiple times to an individual, the biologic and the reference biologic may be alternated or switched after one has been previously administered without increasing safety risks or risks of diminished efficacy relative to exclusive use of the reference biologic.

Under the BPCIA, an application for a biosimilar product may not be submitted to the FDA until four years following the date that the reference product was first licensed by the FDA. In addition, the approval of a biosimilar product may not be made effective by the FDA until 12 years from the date on which the reference product was first licensed. During this 12-year period of exclusivity, another company may still market a competing version of the reference product if the FDA approves a full BLA for the competing product containing that applicant's own preclinical data and data from adequate and well-controlled clinical trials to demonstrate the safety, purity and potency of its product. The BPCIA also created certain exclusivity periods for biosimilars approved as interchangeable products. At this juncture, it is unclear whether products deemed "interchangeable" by the FDA will, in fact, be readily substituted by pharmacies, which are governed by state pharmacy law.

A biological product can also obtain pediatric market exclusivity in the United States. Pediatric exclusivity, if granted, adds six months to existing exclusivity periods and patent terms. This six-month exclusivity, which runs from the end of other exclusivity protection or patent term, may be granted based on the voluntary completion of a pediatric study in accordance with an FDA-issued "Written Request" for such a study.

Foreign Regulation

To market any product outside of the United States, we would need to comply with numerous and varying regulatory requirements of other countries regarding safety and efficacy and governing, among other things, clinical trials, marketing authorization, manufacturing, commercial sales and distribution of our products. Because biologically sourced raw materials are subject to unique contamination risks, their use may be restricted in some countries.

Whether or not we obtain FDA approval of a product, we must obtain the requisite approvals from regulatory authorities in foreign countries prior to the commencement of clinical trials or marketing of the product in those countries. The requirements and process governing the conduct of clinical trials, product licensing, pricing and reimbursement vary from country to country. Failure to comply with applicable foreign regulatory requirements, may be subject to, among other things, fines, suspension or withdrawal of regulatory approvals, product recalls, seizure of products, operating restrictions and criminal prosecution.

Non-clinical studies and clinical trials

Similarly to the United States, the various phases of non-clinical and clinical research in the European Union, ("EU"), are subject to significant regulatory controls.

Non-clinical studies are performed to demonstrate the health or environmental safety of new biological substances. Non-clinical studies must be conducted in compliance with the principles of good laboratory practice ("GLP"), as set forth in EU Directive 2004/10/EC. In particular, non-clinical studies, both in vitro and in vivo, must be planned, performed, monitored, recorded, reported and archived in accordance with the GLP principles, which define a set of rules and criteria for a quality system for the organizational process and the conditions for non-clinical studies. These GLP standards reflect the Organization for Economic Co-operation and Development requirements.

Clinical trials of medicinal products in the EU must be conducted in accordance with EU and national regulations and the International Conference on Harmonization ("ICH") guidelines on GCPs. Additional GCP guidelines from the European Commission, focusing in particular on traceability, apply to clinical trials of advanced therapy medicinal products ("ATMPs"). If the sponsor of the clinical trial is not established within the EU, it must appoint an entity within the EU to act as its legal representative. The sponsor must take out a clinical trial insurance policy, and in most countries, the sponsor is liable to provide 'no fault' compensation to any study subject injured in the clinical trial.

The regulatory landscape related to clinical trials in the EU has been subject to recent changes. The EU Clinical Trials Regulation ("CTR"), which was adopted in April 2014 and repeals the EU Clinical Trials Directive, became applicable on January 31, 2022. Unlike directives, the CTR is directly applicable in all EU member states without the need for member states to further implement it into national law. The CTR notably harmonizes the assessment and supervision processes for clinical trials throughout the EU via a Clinical Trials Information System, which contains a centralized EU portal and database.

While the Clinical Trials Directive required a separate CTA to be submitted in each member state, to both the competent national health authority and an independent ethics committee, much like the FDA and IRB respectively, the CTR introduces a centralized process and only requires the submission of a single application to all member states concerned. The CTR allows sponsors to make a single submission to both the competent authority and an ethics committee in each member state, leading to a single decision per member state. The CTA must include, among other things, a copy of the trial protocol and an investigational medicinal product dossier containing information about the manufacture and quality of the medicinal product under investigation. The assessment procedure of the CTA has been harmonized as well, including a joint assessment by all member states concerned, and a separate assessment by each member state with respect to specific requirements related to its own territory, including ethics rules. Each member state's decision is communicated to the sponsor via the centralized EU portal. Once the CTA is approved, clinical study development may proceed.

The CTR foresees a three-year transition period. The extent to which ongoing and new clinical trials will be governed by the CTR varies. For clinical trials whose CTA was made under the Clinical Trials Directive before January 31, 2022, the Clinical Trials Directive will continue to apply on a transitional basis for three years. Additionally, sponsors may still choose to submit a CTA under either the Clinical Trials Directive or the CTR until January 31, 2023 and, if authorized, those will be governed by the Clinical Trials Directive until January 31, 2025. By that date, all ongoing trials will become subject to the provisions of the CTR.

Medicines used in clinical trials must be manufactured in accordance with Good Manufacturing Practice ("GMP"). Other national and EU-wide regulatory requirements may also apply.

Marketing authorization

To market a medicinal product in the EU, we must obtain a marketing authorization ("MA"). To obtain regulatory approval of a product candidate under EU regulatory systems, we must submit a marketing authorization application ("MAA"). The process for doing this depends, among other things, on the nature of the medicinal product. There are two types of MAs:

- "Centralized MAs" are issued by the European Commission through the centralized procedure, based on the opinion of the Committee for Medicinal Products for Human Use ("CHMP") of the European Medicines Agency ("EMA") and arevalid throughout the EU. The centralized procedure is mandatory for certain types of products, such as (i)medicinal products derived from biotechnology processes, (ii) designated orphan medicinal products, (iii) ATMPs (such as gene therapy, somatic cell therapy and tissue engineered products), and (iv) medicinal products containing a new active substance indicated for the treatment certain diseases, such as HIV/AIDS, cancer, neurodegenerative disorders, diabetes, auto immune and other immune dysfunctions and viral diseases. The centralized procedure is optional for products containing a new active substance not yet authorized in the EU, or for products that constitute a significant therapeutic, scientific or technical innovation or which are in the interest of public health in the EU. Under the centralized procedure, the maximum timeframe for the evaluation of an MAA is 210 days, excluding clock stops. Accelerated evaluation might be granted by the CHMP in exceptional cases when a medicinal product is of major interest from the point of view of public health and in particular from the viewpoint of therapeutic innovation. If the CHMP accepts such request, the time limit of 210 days will be reduced to 150 days but it is possible that the CHMP can revert to the standard time limit for the centralized procedure if it considers that it is no longer appropriate to conduct an accelerated assessment.

- "Conditional MAs" may be granted in cases where all the required safety and efficacy data are not yet available. The conditional MA is subject to conditions to be fulfilled for generating the missing data or ensuring increased safety measures. It is valid for one year and has to be renewed annually until fulfillment of all the conditions. Once the pending studies are provided, it can become a "standard" MA. However, if the conditions are not fulfilled within the timeframe set by the EMA, the MA ceases to be renewed. Furthermore, MAs may also be granted "under exceptional circumstances" when the applicant can show that it is unable to provide comprehensive data on the efficacy and safety under normal conditions of use even after the product has been authorized and subject to specific procedures being introduced. This may arise in particular when the intended indications are very rare and, in the present state of scientific knowledge, it is not possible to provide comprehensive information, or when generating data may be contrary to generally accepted ethical principles. This MA is close to the conditional MA as it is reserved to medicinal products to be approved for severe diseases or unmet medical needs and the applicant does not hold the complete data set legally required for the grant of a MA. However, unlike the conditional MA, the applicant does not have to provide the missing data and will never have to. Although the MA "under exceptional circumstances" is granted definitively, the risk-benefit balance of the medicinal product is reviewed annually and the MA is withdrawn in case the risk-benefit ratio is no longer favorable.
- "National MAs", are issued by the competent authorities of EU member states and only cover their respective territory, and are available for products not falling within the mandatory scope of the Centralized Procedure. Where a product has already been authorized for marketing in an EU member state, this national MA can be recognized in another member state through the mutual recognition procedure. If the product has not received a national MA in any member state at the time of application, it can be approved simultaneously in various member states through the decentralized procedure. Under the Decentralized Procedure an identical dossier is submitted to the competent authority of each of the member states in which the MA is sought, one of which is selected by the applicant as the reference member state.

Under the above described procedures, in order to grant the MA, the EMA or the competent authorities of the EU member states make an assessment of the risk benefit balance of the product on the basis of scientific criteria concerning its quality, safety and efficacy. MAs have an initial duration of five years. After these five years, the authorization may be renewed on the basis of a reevaluation of the risk-benefit balance.

Priority medicines scheme

Innovative products that target an unmet medical need and are expected to be of major public health interest may be eligible for a number of expedited development and review programs, such as the so-called Priority Medicines ("PRIME") scheme, which provides incentives similar to the breakthrough therapy designation in the U.S. PRIME was launched in 2016 by the EMA to support the development and accelerate the review of new therapies to treat patients with unmet medical need. This voluntary scheme is based on enhanced interaction and early dialogue with developers of promising medicines, to optimize development plans and speed up evaluation so these medicines can reach patients earlier. To qualify for PRIME, product candidates require early clinical evidence that the therapy has the potential to offer a therapeutic advantage over existing treatments or benefits patients without treatment options. Product developers that benefit from PRIME designation can expect to be eligible for accelerated assessment but this is not guaranteed. Many benefits accrue to sponsors of product candidates with PRIME designation, including but not limited to, early and proactive regulatory dialogue with the EMA, frequent discussions on clinical trial designs and other development program elements, and accelerated MAA assessment once a dossier has been submitted. Importantly, a dedicated contact and rapporteur from the CHMP

is appointed early in the PRIME scheme facilitating increased understanding of the product at EMA's committee level. An initial meeting initiates these relationships and includes a team of multidisciplinary experts at the EMA to provide guidance on the overall development and regulatory strategies. Innovative medicines fulfilling a medical need may also benefit from different types of fast track approvals, such as a conditional marketing authorization or a marketing authorization under exceptional circumstances granted on the basis of less comprehensive clinical data than normally required (respectively in the likelihood that the sponsor will provide such data within an agreed timeframe or when comprehensive data cannot be obtained even after authorization).

Advanced therapy classification

Based on legislation adopted in 2007, the EMA established an additional regulatory designation for products classified as an ATMP. The ATMP designation offers sponsors a variety of benefits similar to those associated with the PRIME scheme, including scientific and regulatory guidance, additional opportunities for dialogue with regulators, and presubmission review and certification of the chemistry, manufacturing and controls ("CMC") and nonclinical data proposed for submission in a forthcoming MA applications for micro-, small-, or medium-sized enterprises. To qualify for this designation, product candidates intended for human use must be based on gene therapy, somatic cell therapy, or tissue engineered therapy.

Data and marketing exclusivity

In the EU, new products authorized for marketing, or reference products, generally receive eight years of data exclusivity and an additional two years of market exclusivity upon MA. The data exclusivity period prevents generic or biosimilar applicants from relying on the pre-clinical and clinical trial data contained in the dossier of the reference product when applying for a generic or biosimilar MA in the EU during a period of eight years from the date on which the reference product was first authorized in the EU. The market exclusivity period prevents a successful generic or biosimilar applicant from commercializing its product in the EU until 10 years have elapsed from the initial authorization of the reference product in the EU. The 10-year market exclusivity period can be extended to a maximum of eleven years if, during the first eight years of those 10 years, the MA holder obtains an authorization for one or more new therapeutic indications which, during the scientific evaluation prior to their authorization, are held to bring a significant clinical benefit in comparison with existing therapies.

There is a special regime for biosimilars, or biological medicinal products that are similar to a reference medicinal product but that do not meet the definition of a generic medicinal product, for example, because of differences in raw materials or manufacturing processes. For such products, the results of appropriate preclinical or clinical trials must be provided, and guidelines from the EMA detail the type of quantity of supplementary data to be provided for different types of biological product. There are no such guidelines for complex biological products, such as gene or cell therapy medicinal products, and so it is unlikely that biosimilars of those products will currently be approved in the EU. However, guidance from the EMA states that they will be considered in the future in light of the scientific knowledge and regulatory experience gained at the time.

Pediatric development

In the EU, MAAs for new medicinal products have to include the results of studies conducted in the pediatric population, in compliance with a pediatric investigation plan ("PIP"), agreed with the EMA's Pediatric Committee ("PDCO"). The PIP sets out the timing and measures proposed to generate data to support a pediatric indication of the drug for which marketing authorization is being sought. The PDCO can grant a deferral of the obligation to implement some or all of the measures of the PIP until there are sufficient data to demonstrate the efficacy and safety of the product in adults. Further, the obligation to provide pediatric clinical trial data can be waived by the PDCO when these data is not needed or appropriate because the product is likely to be ineffective or unsafe in children, the disease or condition for which the product is intended occurs only in adult populations, or when the product does not represent a significant therapeutic benefit over existing treatments for pediatric patients. Once the MA is obtained in all EU member states and study results are included in the product information, even when negative, the product is eligible for six months' supplementary protection certificate extension (if any is in effect at the time of authorization) or, in the case of orphan products, a two year extension of the orphan market exclusivity.

Orphan Medicinal Products

In the EU, a medicinal product can be designated as an orphan if its sponsor can establish that (1) the product is intended for the diagnosis, prevention or treatment of a life-threatening or chronically debilitating condition; and (2) either (a) such condition affects not more than five in ten thousand persons in the EU when the application is made, or (b) without incentives, it is unlikely that the marketing of the product in the EU would generate sufficient return to justify the necessary investment; and (3) there exists no satisfactory method of diagnosis, prevention or treatment of the condition in question that has been authorized in the EU or, if such method exists, the product will be of significant benefit to those affected by that condition.

In the EU, an application for designation as an orphan product can be made any time prior to the filing of a MAA. Orphan drug designation entitles a party to incentives such fee reductions or fee waivers, protocol assistance, and access to the centralized procedure.

Upon grant of a MA, orphan medicinal products are entitled to a ten-year period of market exclusivity for the approved therapeutic indications, which means the competent authorities, cannot accept another application for a MA, or grant a MA, or accept an application to extend a MA for a similar medicinal product for the same indication for a period of ten years. The period of market exclusivity is extended by two years for orphan medicinal products that have also complied with an agreed PIP. No extension to any supplementary protection certificate can be granted on the basis of pediatric studies for orphan indications.

The orphan exclusivity period may, however, be reduced to six years if, at the end of the fifth year, it is established that the product no longer meets the criteria for orphan drug designation, for example because the product is sufficiently profitable not to justify market exclusivity, or where the prevalence of the condition has increased above the threshold. Granting of an authorization for another similar orphan medicinal product where another product has market exclusivity can happen at any time if: (i) the second applicant can establish that its product, although similar to the authorized product, is safer, more effective or otherwise clinically superior, (ii) inability of the applicant to supply sufficient quantities of the orphan medicinal product or (iii) where the applicant consents to a second orphan medicinal product application. A company may voluntarily remove a product from the orphan register.

Orphan designation does not convey any advantage in, or shorten the duration of, the regulatory review and approval process.

Post-Approval Requirements

Similar to the United States, both MA holders and manufacturers of medicinal products are subject to comprehensive regulatory oversight by the EMA, the European Commission and/or the competent regulatory authorities of the member states. The holder of a MA must establish and maintain a pharmacovigilance system and appoint an individual qualified person for pharmacovigilance who is responsible for oversight of that system. Key obligations include expedited reporting of suspected serious adverse reactions and submission of periodic safety update reports ("PSURs").

All new MAAs must include a risk management plan ("RMP") describing the risk management system that the company will put in place and documenting measures to prevent or minimize the risks associated with the product. The regulatory authorities may also impose specific obligations as a condition of the MA. Such risk-minimization measures or post-authorization obligations may include additional safety monitoring, more frequent submission of PSURs, or the conduct of additional clinical trials or post-authorization safety studies.

The advertising and promotion of medicinal products is also subject to laws concerning promotion of medicinal products, interactions with physicians, misleading and comparative advertising and unfair commercial practices. All advertising and promotional activities for the product must be consistent with the approved summary of product characteristics, and therefore all off-label promotion is prohibited. Direct-to-consumer advertising of prescription medicines is also prohibited in the EU. Although general requirements for advertising and promotion of medicinal products are established under EU directives, the details are governed by regulations in each member state and can differ from one country to another.

The aforementioned EU rules are generally applicable in the European Economic Area, or EEA, which consists of the 27 EU member states plus Norway, Liechtenstein and Iceland.

Failure to comply with EU and member state laws that apply to the conduct of clinical trials, manufacturing approval, MA of medicinal products and marketing of such products, both before and after grant of the MA, manufacturing of pharmaceutical products, statutory health insurance, bribery and anti-corruption or with other applicable regulatory requirements may result in administrative, civil or criminal penalties. These penalties could include delays or refusal to authorize the conduct of clinical trials, or to grant MA, product withdrawals and recalls, product seizures, suspension, withdrawal or variation of the MA, total or partial suspension of production, distribution, manufacturing or clinical trials, operating restrictions, injunctions, suspension of licenses, fines and criminal penalties.

Brexit and the Regulatory Framework in the United Kingdom

The UK left the EU on January 31, 2020, following which existing EU medicinal product legislation continued to apply in the UK during the transition period under the terms of the EU-UK Withdrawal Agreement. The transition period, which ended on December 31, 2020, maintained access to the EU single market and to the global trade deals negotiated by the EU on behalf of its members. The transition period provided time for the UK and EU to negotiate a framework for partnership for the future, which was then crystallized in the Trade and Cooperation Agreement ("TCA"), and became effective on the January 1, 2021. The TCA includes specific provisions concerning pharmaceuticals, which include the mutual recognition of GMP inspections of manufacturing facilities for medicinal products and GMP documents issued, but does not foresee wholesale mutual recognition of UK and EU pharmaceutical regulations.

EU laws which have been transposed into UK law through secondary legislation continue to be applicable as "retained EU law". However, new legislation such as the EU CTR will not be applicable. The UK government has passed a new Medicines and Medical Devices Act 2021, which introduces delegated powers in favor of the Secretary of State or an 'appropriate authority' to amend or supplement existing regulations in the area of medicinal products and medical devices. This allows new rules to be introduced in the future by way of secondary legislation, which aims to allow flexibility in addressing regulatory gaps and future changes in the fields of human medicines, clinical trials and medical devices.

As of January 1, 2021, the Medicines and Healthcare products Regulatory Agency ("MHRA"), is the UK's standalone medicines and medical devices regulator. As a result of the Northern Ireland protocol, different rules will apply in Northern Ireland than in England, Wales, and Scotland (together "Great Britain" or "GB"); broadly, Northern Ireland will continue to follow the EU regulatory regime, but its national competent authority will remain the MHRA. The MHRA has published a guidance on how various aspects of the UK regulatory regime for medicines will operate in GB and in Northern Ireland following the expiry of the Brexit transition period on December 31, 2020. The guidance includes clinical trials, importing, exporting, and pharmacovigilance and is relevant to any business involved in the research, development, or commercialization of medicines in the UK. The new guidance was given effect via the Human Medicines Regulations (Amendment etc.) (EU Exit) Regulations 2019, or the Exit Regulations.

The MHRA has introduced changes to national licensing procedures, including procedures to prioritize access to new medicines that will benefit patients, including a 150-day assessment and a rolling review procedure. All existing EU MAs for centrally authorized products were automatically converted or grandfathered into UK MAs, effective in GB (only), free of charge on January 1, 2021, unless the MA holder chooses to opt-out. In order to use the centralized procedure to obtain a MA that will be valid throughout the EEA, companies must be established in the EEA. Therefore after Brexit, companies established in the UK can no longer use the EU centralized procedure and instead an EEA entity must hold any centralized MAs. In order to obtain a UK MA to commercialize products in the UK, an applicant must be established in the UK and must follow one of the UK national authorization procedures or one of the remaining post-Brexit international cooperation procedures to obtain an MA to commercialize products in the UK. The MHRA may rely on a decision taken by the European Commission on the approval of a new (centralized procedure) MA when determining an application for a GB authorization; or use the MHRA's decentralized or mutual recognition procedures which enable MAs approved in EU member states (or Iceland, Liechtenstein, Norway) to be granted in GB.

There will be no pre-MA orphan designation. Instead, the MHRA will review applications for orphan designation in parallel to the corresponding MA application. The criteria are essentially the same, but have been tailored for the market, i.e., the prevalence of the condition in GB, rather than the EU, must not be more than five in 10,000. Should an orphan designation be granted, the period or market exclusivity will be set from the date of first approval of the product in GB.

Other U.S. Healthcare Laws and Compliance Requirements

In the United States, our activities are potentially subject to regulation under various federal and state healthcare laws including, among others, the federal Anti-Kickback Statute, the federal False Claims Act and HIPAA. Similar laws exist in foreign jurisdictions including the EU, as well.

The U.S. federal Anti-Kickback Statute prohibits, among other things, any person or entity, from knowingly and willfully offering, paying, soliciting or receiving any remuneration, directly or indirectly, overtly or covertly, in cash or in kind, to induce or in return for purchasing, leasing, ordering or arranging for the purchase, lease or order of any item or service reimbursable under Medicare, Medicaid or other federal healthcare programs. The term remuneration has been interpreted broadly to include anything of value. A person does not need to have knowledge of the statute or specific intent to violate it to have committed a violation.

The U.S. federal civil and criminal false claims laws, including the civil False Claims Act, which can be enforced through civil whistleblower or qui tam actions, and civil monetary penalties laws, prohibit, among other things, any person or entity from knowingly presenting, or causing to be presented, a false claim for payment to, or approval by, the federal government or knowingly making, using, or causing to be made or used a false record or statement material to a false or fraudulent claim to the federal government, or from knowingly making a false statement to avoid, decrease or conceal an obligation to pay money to the U.S. government. In addition, the government may assert that a claim including items or services resulting from a violation of the U.S. federal Anti-Kickback Statute constitutes a false or fraudulent claim for purposes of the civil False Claims Act.

The U.S. Health Insurance Portability and Accountability Act of 1996, or HIPAA, created additional federal criminal statutes that prohibit knowingly and willfully executing, or attempting to execute, a scheme to defraud or to obtain, by means of false or fraudulent pretenses, representations or promises, any money or property owned by, or under the control or custody of, any healthcare benefit program, including private third-party payors and knowingly and willfully falsifying, concealing or covering up by trick, scheme or device, a material fact or making any materially false, fictitious or fraudulent statement in connection with the delivery of or payment for healthcare benefits, items or services. Similar to the U.S. federal Anti-Kickback Statute, a person or entity does not need to have actual knowledge of the statute or specific intent to violate it in order to have committed a violation.

Additionally, the federal Physician Payments Sunshine Act, and its implementing regulations, require that certain manufacturers of drugs, devices, biological and medical supplies for which payment is available under Medicare, Medicaid or the Children's Health Insurance Program (with certain exceptions) to report annually to CMS information related to certain payments or other transfers of value made or distributed to physicians (defined to include doctors, dentists, optometrists, podiatrists and chiropractors), certain non-physician practitioners including physician assistants and nurse practitioners, and teaching hospitals, or to entities or individuals at the request of, or designated on behalf of, the physicians and teaching hospitals and to report annually to CMS certain ownership and investment interests held by physicians and their immediate family members.

Moreover, analogous state and foreign laws and regulations may apply to our activities, such as state anti-kickback and false claims laws, which may apply to our business practices, including, but not limited to, research, distribution, sales and marketing arrangements and claims involving healthcare items or services reimbursed by non-governmental third-party payors, including private insurers, or by the patients themselves, state laws that require pharmaceutical and device companies to comply with the industry's voluntary compliance guidelines and the relevant compliance guidance promulgated by the U.S. government, or otherwise restrict payments that may be made to healthcare providers and other potential referral sources, state and local laws and regulations that require manufacturers to report information related to payments and other transfers of value to physicians and other healthcare providers or marketing expenditures and pricing information, and state and local laws which require the registration of pharmaceutical sales representatives.

Efforts to ensure that current and future business arrangements with third parties comply with applicable healthcare laws and regulations involves substantial costs. If a business is found to be in violation of any of these or any other health regulatory laws that may apply to it, it may be subject to significant penalties, including the imposition of significant civil, criminal and administrative penalties, damages, monetary fines, disgorgement, individual imprisonment, possible exclusion from participation in Medicare, Medicaid and other U.S. healthcare programs, additional reporting requirements and oversight if subject to a corporate integrity agreement or similar agreement to resolve allegations of non-compliance with these laws, contractual damages, reputational harm, diminished profits and future earnings, and curtailment or restructuring of operations.

Coverage, Pricing and Reimbursement

Significant uncertainty exists as to the coverage and reimbursement status for newly approved therapeutics. In the United States and markets in other countries, sales of any products for which we receive regulatory approval for commercial sale will depend, in part, on the extent to which third-party payors provide coverage, and establish adequate reimbursement levels for such products. In the United States, third-party payors include federal and state healthcare programs, private managed care providers, health insurers and other organizations. For products administered under the supervision of a physician, obtaining coverage and adequate reimbursement may be particularly difficult because of the higher prices often associated with such drugs. A payor's decision to provide coverage for a product does not imply that an adequate reimbursement rate will be approved. Further, one payor's determination to provide coverage for a product does not assure that other payors will also provide coverage for the product. Moreover, the coverage provided may be more limited than the purposes for which the product is approved by the FDA. It is also possible that a third-party payor may consider a product as substitutable and only offer to reimburse patients for the less expensive product. Adequate third-party payor reimbursement may not be available to enable us to maintain price levels sufficient to realize an appropriate return on our investment in product development. Coverage policies and third-party payor reimbursement rates may change at any time. Even if favorable coverage and reimbursement status is attained for one or more products for which we receive regulatory approval, less favorable coverage policies and reimbursement rates may be implemented in the future.

In the EU, governments influence the price of products through their pricing and reimbursement rules and control of national health care systems that fund a large part of the cost of those products to consumers. Member states are free to restrict the range of pharmaceutical products for which their national health insurance systems provide reimbursement, and to control the prices and reimbursement levels of pharmaceutical products for human use. Some jurisdictions operate positive and negative list systems under which products may only be marketed once a reimbursement price has been agreed to by the government. Member states may approve a specific price or level of reimbursement for the pharmaceutical product, or alternatively adopt a system of direct or indirect controls on the profitability of the company responsible for placing the pharmaceutical product on the market, including volume-based arrangements, caps and reference pricing mechanisms. To obtain reimbursement or pricing approval, some of these countries may require the completion of clinical trials that compare the cost effectiveness of a particular product candidate to currently available therapies. Other member states allow companies to fix their own prices for medicines, but monitor and control company profits. The downward pressure on health care costs in general, particularly prescription products, has become very intense. As a result, increasingly high barriers are being erected to the entry of new products. In addition, in some countries, cross border imports from low-priced markets exert a commercial pressure on pricing within a country.

Healthcare Reform

In the United States and some foreign jurisdictions, there have been, and continue to be, several legislative and regulatory changes and proposed changes regarding the healthcare system that could prevent or delay marketing approval of product candidates, restrict or regulate post-approval activities, and affect the ability to profitably sell product candidates for which marketing approval is obtained. Among policy makers and payors in the United States and elsewhere, there is significant interest in promoting changes in healthcare systems with the stated goals of containing healthcare costs, improving quality and/or expanding access. The Patient Protection and Affordable Care Act, as amended by the Health Care and Education Reconciliation Act, collectively the ACA, enacted in March 2010, has substantially changed healthcare financing and delivery by both governmental and private insurers. Among other things the ACA included the following provisions:

- an annual, nondeductible fee on any entity that manufactures or imports certain specified branded prescription drugs and biologic agents apportioned among these entities according to their market share in some government healthcare programs;
- an increase in the statutory minimum rebates a manufacturer must pay under the Medicaid Drug Rebate Program;
- a new Medicare Part D coverage gap discount program, in which manufacturers must now agree to point-of-sale discounts of 70% off negotiated prices of applicable brand drugs to eligible beneficiaries during their coverage gap period, as a condition for the manufacturers' outpatient drugs to be covered under Medicare Part D;
- extension of manufacturers' Medicaid rebate liability to covered drugs dispensed to individuals who are enrolled in Medicaid managed care organizations;
- expansion of eligibility criteria for Medicaid programs;
- expansion of the entities eligible for discounts under the 340B Drug Discount Program;
- a new Patient-Centered Outcomes Research Institute to oversee, identify priorities in, and conduct comparative clinical effectiveness research, along with funding for such research;
- a new methodology by which rebates owed by manufacturers under the Medicaid Drug Rebate Program are calculated for drugs that are inhaled, infused, instilled, implanted, or injected; and
- a licensure framework for follow on biologic products.

Since its enactment, there have been judicial, administrative, executive, and legislative challenges to certain aspects of the ACA. On June 17, 2021, the U.S. Supreme Court (the "Supreme Court") dismissed the most recent judicial challenge to the ACA brought by several states on procedural grounds without specifically ruling on the constitutionality of the ACA. Thus, the ACA will remain in effect in its current form. Prior to the Supreme Court's decision. President Biden issued an executive order that initiated a special enrollment period from February 15, 2021 through August 15, 2021 for purposes of obtaining health insurance coverage through the ACA marketplace. The executive order also instructed certain governmental agencies to review and reconsider their existing policies and rules that limit access to healthcare, including among others, reexamining Medicaid demonstration projects and waiver programs that include work requirements, and policies that create unnecessary barriers to obtaining access to health insurance coverage through Medicaid or the ACA. It is unclear how other health reform measures of the Biden administration will impact our business.

In addition, other legislative changes have been proposed and adopted since the ACA was enacted. On August 2, 2011, the Budget Control Act of 2011 was signed into law, which, among other things, included reductions to Medicare payments to providers of 2% per fiscal year, which went into effect on April 1, 2013 and, due to subsequent legislative amendments to the statute will remain in effect through 2030, with the exception of a temporary suspension from May 1, 2020 through March 31, 2022, unless additional Congressional action is taken. On January 2, 2013, the American Taxpayer Relief Act of 2012 was signed into law, which, among other things, reduced Medicare payments to several providers, including hospitals, and increased the statute of limitations period for the government to recover overpayments to providers from three to five years.

Finally, there has been heightened governmental scrutiny recently over pharmaceutical pricing practices in light of the rising cost of prescription drugs and biologics. Such scrutiny has resulted in several recent Congressional inquiries and proposed and enacted federal and state legislation designed to, among other things, bring more transparency to product pricing, review the relationship between pricing and manufacturer patient programs, and reform government program reimbursement methodologies, rebates and price negotiation for pharmaceutical products. At the state level, legislatures have increasingly passed legislation and implemented regulations designed to control pharmaceutical product and medical device pricing, including price or patient reimbursement constraints, discounts, restrictions on certain product access and marketing cost disclosure and transparency measures, and, in some cases, designed to encourage importation from other countries and bulk purchasing. In addition, regional healthcare authorities and individual hospitals are increasingly using bidding procedures to determine what pharmaceutical products and medical devices to purchase and which suppliers will be included in their prescription drug and other healthcare programs.

Data Privacy and Security

Numerous state, federal and foreign laws, including consumer protection laws and regulations, govern the collection, dissemination, use, access to, confidentiality and security of personal information, including health-related information. In the United States, numerous federal and state laws and regulations, including data breach notification laws, health information privacy and security laws, including HIPAA, and federal and state consumer protection laws and regulations (e.g., Section 5 of the FTC Act), that govern the collection, use, disclosure, and protection of health-related and other personal information could apply to our operations or the operations of our partners. In addition, certain state foreign laws, such as the California Consumer Privacy Act ("CCPA"), the California Privacy Rights Act ("CPRA"), and the EU General Data Protection Regulation ("GDPR") and the UK GDPR, govern the privacy and security of personal information, including health-related information in certain circumstances, some of which are more stringent than HIPAA and many of which differ from each other in significant ways and may not have the same effect, thus complicating compliance efforts. Failure to comply with these laws, where applicable, can result in the imposition of significant civil and/or criminal penalties and private litigation. Privacy and security laws, regulations, and other obligations are constantly evolving, may conflict with each other to complicate compliance efforts, and can result in investigations, proceedings, or actions that lead to significant civil and/or criminal penalties and restrictions on data processing.

Human Capital

We are a purpose-driven organization, and we believe we have carefully promoted a culture that values innovation, accountability, respect, adaptability and perseverance. We strive to ensure that our open, collaborative culture empowers Precisioneers to be their best selves and do their best work. We strongly believe that our shared values will help our team navigate and overcome challenges we may experience as we pursue our mission of improving life through genome editing. Our culture has helped build a world-class team with industry-leading experience in genome editing and we believe this will continue to attract new talent to further build our capabilities. Our team is a group of motivated individuals that value the opportunity to contribute their time and talents toward the pursuit of improving life. We believe all Precisioneers appreciate high-quality research and are moved by the opportunity to translate their work into treatments and solutions that could impact human health.

We are a company and a community dedicated to improving life. This isn't just a statement supporting the products that we are developing – it is a statement that speaks to our collective desire to do our part in improving the lives of those around us. Through our Diversity and Inclusion initiative, we are actively fostering an environment that attracts the best talent, values diversity of life experiences and perspectives, and encourages innovation in pursuit of our mission. With guest lectures, new trainings, development of employee resource groups, and other activities, we are supporting a workplace that reflects and embraces the gender, race, ethnicity, sexual orientation, age, physical ability, as well as all cultural backgrounds in our community. As of February 24, 2022, our workforce was self-reportedly approximately 49% women and approximately 27% Asian, Black, Latinx, two or more races, or not defined. Our senior leadership team and department heads were self-reportedly approximately 28% women and 12% Asian or Black as of February 25, 2021.

Notable benefits we offer to our full-time Precisioneers include:

- employer sponsored health insurance;
- employer 401(k) matching contributions;
- generous paid time off policies;
- wellness programs including employee assistance programs, wellness reimbursement, and an on-site gym; and
- professional development programs including a tuition reimbursement program

The health and safety of our Precisioneers is also a top priority. The global effects associated with the COVID-19 pandemic have been unprecedented in their scope and depth. We have implemented measures to mitigate exposure risks and support operations. We initiated a health and safety program addressing mandatory use of face masks, mandatory vaccinations, social distancing, sanitary handwashing practices, use of personal protective equipment stations, stringent cleaning and sanitization of all facilities and measures to reduce total occupancy in facilities. We have implemented temperature and symptom screening procedures at each location, and we have continuously communicated to all our Precisioneers that if they are not comfortable coming to work, regardless of role, then they do not have to do so. Throughout this crisis, our focus has been on keeping our workplace as safe as possible, while ensuring business continuity and positioning ourselves well for the future.

As of December 31, 2021, we had 198 full-time Precisioneers. Of these full-time employees, 156 are engaged in research and development activities and 45 have Ph.D. or M.D. degrees. None of our employees are represented by a labor union or covered by a collective bargaining agreement.

Corporate Information

We were incorporated in Delaware in January 2006. Our principal executive offices are located at 302 East Pettigrew St., Suite A-100, Durham, North Carolina 27701, and our telephone number is (919) 314-5512. Our website address is www.precisionbiosciences.com. The information contained in, or accessible through, our website does not constitute a part of this Annual Report on Form 10-K.

Available Information

We file annual, quarterly and current reports, proxy statements and other information with the U.S. Securities and Exchange Commission ("SEC"). Our SEC filings are available to the public over the Internet at the SEC's website at *www.sec.gov*. Our SEC filings are also available free of charge under the Investors and Media section of our website at *www.precisionbiosciences.com* as soon as reasonably practicable after they are filed with or furnished to the SEC. Our website and the information contained on or connected to that site are not incorporated into this Annual Report on Form 10-K.

We may use our website as a distribution channel of material information about the Company. Financial and other important information regarding the Company is routinely posted on and accessible through the Investors and Media section of our website at *www.precisionbiosciences.com*. In addition, you may automatically receive email alerts and other information about the Company when you enroll your email address by visiting the "Email Alerts" option under Investor Tools of the Investors and Media section of our website at *www.precisionbiosciences.com*.

Item 1A. Risk Factors.

Investing in our common stock involves a high degree of risk. Before investing in our common stock, you should consider carefully the risks described below, together with the other information included or incorporated by reference in this Annual Report on Form 10-K. The occurrence of any of the following risks could materially adversely affect our business, financial condition, results of operations and future growth prospects. In these circumstances, the market price of our common stock could decline, and you may lose all or part of your investment.

Risks Related to Our Financial Condition, Limited Operating History and Need for Additional Capital

We have incurred significant operating losses since our inception and expect to continue to incur losses for the foreseeable future. We have not been profitable and may not achieve or maintain profitability.

We do not expect to be profitable in the foreseeable future. Since inception, we have incurred significant operating losses. If our product candidates are not successfully developed and approved, we may never generate any revenue from product sales. Our net loss was $30.6 million for the year ended December 31, 2021 and we reported a net loss of $109.0 million for the year ended December 31, 2020. As of December 31, 2021, we had an accumulated deficit of $316.7 million. In addition, we have not commercialized any products and have never generated any revenue from product sales. Substantially all of our losses have resulted from expenses incurred in connection with our research and development activities, including our preclinical development activities, and from general and administrative costs associated with our operations. We have financed our operations primarily through proceeds from upfront and milestone payments from collaboration and licensing agreements, our IPO, private placements of our convertible preferred stock and convertible debt financings, at-the-market offerings of common stock, and borrowings on credit facilities. The amount of our future net losses will depend, in part, on the amount and growth rate of our expenses and our ability to generate revenues.

All of our current or future product candidates will require substantial additional development time and resources before we may realize revenue from product sales, if at all. We expect to continue to incur significant expenses and operating losses for the foreseeable future. Our expenses have increased and we anticipate will continue to increase substantially if and as we:

- continue our current research and development programs, including conducting laboratory, and preclinical studies for product candidates;
- continue to conduct or initiate clinical trials for product candidates;
- seek to identify, assess, acquire or develop additional research programs or product candidates;
- maintain, expand and protect our intellectual property portfolio;
- seek marketing approvals for any product candidates that may successfully complete development;
- establish a sales, marketing and distribution infrastructure to commercialize any products that may obtain marketing approval;
- further develop and refine the manufacturing process for our product candidates;
- change or add additional manufacturers or suppliers of biological materials or product candidates;
- further develop our genome editing technology;
- acquire or in-license other technologies;
- seek to attract new and retain existing personnel;
- expand our facilities; and
- incur increased costs as a result of operating as a public company.

It will be several years, if ever, before we obtain regulatory approval for, and are ready for commercialization of, a therapeutic product candidate. Even if a therapeutic product candidate receives regulatory approval, future revenues for such product candidate will depend upon many factors, such as, as applicable, the size of any markets in which such product candidate is approved for sale, the market share captured by such product candidate, including as a result of the market acceptance of such product candidate and the effectiveness of manufacturing, sales, marketing and distribution operations related to such product candidate, the terms of any collaboration or other strategic arrangement we may have with respect to such product candidate and levels of reimbursement from third-party payors. If we are unable to develop and commercialize one or more product candidates either alone or with collaborators, or if revenues from any product candidate that receives marketing approval or is commercialized are insufficient, we may not achieve

profitability. Even if we do achieve profitability, we may not be able to sustain or increase profitability. If we are unable to achieve and maintain profitability, the value of our common stock will be materially adversely affected.

We will need substantial additional funding, and if we are unable to raise a sufficient amount of capital when needed on acceptable terms, or at all, we may be forced to delay, reduce or eliminate some or all of our research programs, product development activities and commercialization efforts.

The process of identifying product candidates and conducting preclinical studies and clinical trials is time consuming, expensive, uncertain and takes years to complete. We expect our expenses to increase in connection with our ongoing activities, particularly as we identify, continue the research and development of, initiate and continue clinical trials of, and seek marketing approval for, product candidates. In addition, if any therapeutic product candidate that we develop alone or with collaborators obtains marketing approval, we may incur significant commercialization expenses related to product manufacturing, sales, marketing and distribution efforts. Furthermore, we have incurred, and expect to continue to incur additional costs associated with operating as a public company. Accordingly, we will need to obtain substantial additional funding in connection with our continuing operations. If we are unable to raise sufficient capital when needed, we may be forced to delay, reduce or eliminate current or future research programs, product development activities and/or commercialization efforts.

We believe that, as of the date of this Annual Report on Form 10-K, existing cash and cash equivalents, expected operational receipts and available credit will allow us to fund our operating expense and capital expenditure requirements into mid-2023. We have based this estimate on assumptions that may prove to be wrong, and we could use our capital resources sooner than we currently expect. Our operating plans and other demands on our cash resources may change as a result of many factors, including factors unknown to us, and we may need to seek additional funds sooner than planned, through public or private equity or debt financings or other sources, such as strategic collaborations. We do not currently expect future grant revenues to be a material source of revenue.

Attempting to secure additional financing may divert our management from our day-to-day activities, which may adversely affect our ability to develop product candidates. Our future capital requirements will depend on many factors, including:

- the timing, scope, progress, costs, results and analysis of results of research activities, preclinical studies and clinical trials for any of our product candidates;
- the costs of future activities, including product manufacturing, sales, marketing and distribution activities for any product candidates that receive regulatory approval;
- the success of our existing collaborative relationships;
- the extent to which we exercise any development or commercialization rights under collaborative relationships;
- our ability to establish and maintain additional collaborative relationships on favorable terms, or at all;
- the extent to which we expand our operations and the timing of such expansion, including with respect to facilities, employees and product development platforms;
- the costs of preparing, filing and prosecuting patent applications, maintaining and enforcing our intellectual property and proprietary rights and defending intellectual property-related claims;
- the extent to which we acquire or in-license other technologies or product candidates;
- the extent to which we acquire or invest in other businesses;
- the costs of continuing to operate as a public company; and
- the amount of revenues, if any, received from commercial sales of any products that we develop alone or with collaborators that receive regulatory approval.

Even if we believe we have sufficient funds for our current or future operating plans, we may continue to seek additional capital if market conditions are favorable or in light of specific strategic considerations. Adequate additional financing may not be available to us on acceptable terms, or at all. If we are unable to obtain sufficient funding on a timely basis or on favorable terms, we may be required to significantly delay, reduce or eliminate one or more of our research or product development programs and/or commercialization efforts. We may also be unable to expand our operations or otherwise capitalize on business opportunities as desired. Any of these events could materially adversely affect our financial condition and business prospects.

Provisions of our debt instruments may restrict our ability to pursue our business strategies.

In May 2019, the Company entered into a loan and security agreement with Pacific Western Bank ("PWB"), (as subsequently amended, the "Revolving Line"). Pursuant to the terms of the Revolving Line, we may request advances on a revolving line of credit of up to an aggregate principal of $30.0 million and the maturity date of the Revolving Line is June 23, 2023. As of December 31, 2021, we had $2.5 million in borrowings under our Revolving Line. Pursuant to the terms of the Revolving Line, we granted PWB a security interest in substantially all of our assets, excluding any of the intellectual property now or hereafter owned, acquired or received by us (but including any rights to payment from the sale or licensing of any such intellectual property).

The Revolving Line requires us, and any debt instruments we may enter into in the future may require us, to comply with various covenants that limit our ability to, among other things:

- dispose of assets;
- change our name, location, executive office or executive management, business, fiscal year, or control;
- complete mergers or acquisitions;
- incur indebtedness;
- encumber assets;
- pay dividends or make other distributions to holders of our capital stock;
- make specified investments;
- make capitalized expenditures in excess of $40 million in the aggregate during each fiscal year;
- maintain less than $10.0 million of unrestricted cash at PWB; and
- engage in certain transactions with our affiliates.

These restrictions could inhibit our ability to pursue our business strategies. In addition, we are subject to financial covenants based on minimum cash balances.

Raising additional capital may cause dilution to our stockholders restrict our operations or require us to relinquish rights to our technologies or product candidates.

Until such time, if ever, as we can generate substantial product revenues, we expect to finance our cash needs through a combination of equity and/or debt financings and collaborations, licensing agreements or other strategic arrangements. To the extent that we raise additional capital through the sale of equity or convertible debt securities, including in at-the-market offerings, your ownership interest will be diluted, and the terms of such securities may include liquidation or other preferences that adversely affect your rights as a common stockholder. To the extent that we raise additional capital through debt financing, it would result in increased fixed payment obligations and a portion of our operating cash flows, if any, being dedicated to the payment of principal and interest on such indebtedness. In addition, debt financing may involve agreements that include restrictive covenants that impose operating restrictions, such as restrictions on the incurrence of additional debt, the making of certain capital expenditures or the declaration of dividends. To the extent we raise additional capital through arrangements with collaborators or otherwise, we may be required to relinquish some of our technologies, research programs, product development activities, product candidates and/or future revenue streams, license our technologies and/or product candidates on unfavorable terms or otherwise agree to terms unfavorable to us. Furthermore, any capital raising efforts may divert our management from their day-to-day activities, which may adversely affect our ability to advance research programs, product development activities or product candidates.

We have a limited operating history, which makes it difficult to evaluate our current business and future prospects and may increase the risk of your investment.

We are a genome editing company with a limited operating history. We formed our company in 2006 and spent the first nine years of our company's history developing and refining our core technology, and only during the past several years have we focused our efforts on advancing the development of product candidates.

Investment in biopharmaceutical product development is a highly speculative endeavor. It entails substantial upfront capital expenditures, and there is significant risk that any product candidate will fail to demonstrate adequate efficacy or an acceptable safety profile, obtain any required regulatory approvals or become commercially viable. Our genome editing platform and the technologies we are using are new and unproven. We have initiated a Phase 1/2a clinical trial in patients with R/R NHL and R/R B-ALL, a Phase 1 clinical trial in patients with NHL and a Phase 1/2a clinical trial in patients with R/R multiple myeloma. We have not yet

demonstrated an ability to successfully complete any clinical trials, obtain any required marketing approvals, manufacture products, conduct sales, marketing and distribution activities, or arrange for a third party to do any of the foregoing on our behalf. Consequently, any predictions made about our future success or viability may not be as accurate as they could be if we had a history of successfully developing and commercializing products.

Additionally, we encounter risks and difficulties frequently experienced by new and growing companies in rapidly developing and changing industries, including challenges in forecasting accuracy, determining appropriate investments of our limited resources, gaining market acceptance of our technology, managing a complex regulatory landscape and developing new product candidates, which may make it more difficult to evaluate our likelihood of success. Our current operating model may require changes in order for us to adjust to these challenges or scale our operations efficiently. Our limited operating history, particularly in light of the rapidly evolving nature of the biopharmaceutical industry and the genome editing field, may make it difficult to evaluate our technology and business prospects or to predict our future performance. Additionally, due to the stage of our operations, we expect that our financial condition and operating results may fluctuate significantly from quarter to quarter as a result of many factors as we build our business, and you should not rely upon the results of any particular quarterly or annual period as indications of future operating performance.

We may expend our limited resources on pursuing particular research programs or product candidates that may be less successful or profitable than other programs or product candidates.

Research programs to identify new product candidates and product development platforms require substantial technical, financial and human resources. We may focus our efforts and resources on potential programs, product candidates or product development platforms that ultimately prove to be unsuccessful. Any time, effort and financial resources we expend on identifying and researching new product candidates and product development platforms may divert our attention from, and adversely affect our ability to continue, development and commercialization of existing research programs, product candidates and product development platforms. Clinical trials of any of our product candidates may never commence despite the expenditure of significant resources in pursuit of their development, and our spending on current and future research and development programs, product candidates and product development platforms may not yield any commercially viable products. As a result of having limited financial and managerial resources, we may forego or delay pursuit of opportunities that later prove to have greater commercial potential. For example, in 2021 we entered into an agreement with a syndicate of investors to separate from our wholly owned subsidiary, Elo Life Systems, and create an independent new food and agriculture business. Our resource allocation decisions may cause us to fail to timely capitalize on viable commercial products or profitable market opportunities. Additionally, if we do not accurately evaluate the commercial potential or target market for a particular product candidate, we may relinquish valuable rights to that product candidate through collaboration, licensing or other strategic arrangements in cases in which it would have been more advantageous for us to retain sole development and commercialization rights to such product candidate.

Risks Related to the Identification, Development and Commercialization of Our Product Candidates

ARCUS is a novel technology, making it difficult to predict the time, cost and potential success of product candidate development. We have not yet been able to assess the safety and efficacy of most of our product candidates in humans and have only limited safety and efficacy information in humans to date regarding three of our product candidates.

Our success depends on our ability to develop and commercialize product candidates using our novel genome editing technology. The novel nature of our technology makes it difficult to accurately predict the developmental challenges we may face for product candidates as they proceed through research, preclinical studies and clinical trials. There have been a limited number of clinical trials of products created with genome editing technologies, four of which have utilized our technology. Because our therapeutic research programs are all in preclinical or early clinical stages, we have only been able to assess limited safety and efficacy data for one of our product candidates in a human trial. Current or future product candidates may not meet safety and efficacy requirements for continued development or ultimate approval in humans and may cause significant adverse events or toxicities. All of our product candidates are designed to act at the level of DNA, and because animal DNA differs from human DNA, it will be difficult for us to test our therapeutic product candidates in animal models for either safety or efficacy, and any testing that we conduct may not translate to their effects in humans. Moreover, animal models may not exist for some of the targets, diseases or indications that we intend to pursue. Our product candidates may not be able to properly implement desired genetic edits with sufficient accuracy to be viable therapeutic products, and there may be long-term effects associated with them that we cannot predict at this time. Any problems we experience related to the development of our genome editing technology or any of our or our collaborators' research programs or product candidates may cause significant delays or unanticipated costs, and we may not be able to satisfactorily solve such problems. These factors may prevent us or our collaborators from completing our preclinical studies or any clinical trials that we or our collaborators have ongoing or may initiate, or profitably commercializing any product candidates on a timely basis, or at all. We may also experience delays in developing a sustainable, reproducible and scalable manufacturing process as we develop and prepare to commercialize product candidates. These factors make it more difficult for us to predict the time, cost and potential success of product candidate development. If our product development activities take longer or cost more than anticipated, or if they ultimately are not successful, it would materially adversely affect our business and results of operations.

The genome editing field is relatively new and evolving rapidly, and other existing or future technologies may provide significant advantages over our ARCUS platform, which could materially harm our business.

To date, we have focused our efforts on optimizing our proprietary genome editing technology and exploring its potential applications. ARCUS is a novel genome editing technology using sequence-specific DNA-cutting enzymes, or nucleases, that is designed to perform modifications in the DNA of living cells and organisms. Other companies have previously undertaken research and development of genome editing technologies using zinc finger nucleases, transcription activator-like effector nucleases ("TALENs") and clustered regularly interspaced short palindromic repeats associated protein-9 nuclease ("CRISPR/Cas9"), although none has obtained marketing approval for a product candidate developed using such technologies. Other genome editing technologies in development or commercially available, or other existing or future technologies, may lead to treatments or products that may be considered better suited for use in human therapeutics, which could reduce or eliminate our commercial opportunity.

We are heavily dependent on the successful development and translation of ARCUS, and due to the early stages of our product development operations, we cannot give any assurance that any product candidates will be successfully developed and commercialized.

We are at an early stage of development of the product candidates currently in our programs and are continuing to develop our ARCUS technology. To date, we have invested substantially all of our efforts and financial resources to develop ARCUS and advance our current product development programs, including conducting preclinical studies, early stage clinical trials and other early research and development activities, and providing general and administrative support for these operations. We are also currently using our ARCUS technology to develop our lead *in vivo* gene correction programs targeting PH1, PCSK9, HBV and DMD. Our future success is dependent on our ability to successfully develop and, where applicable, obtain regulatory approval for, including marketing approval for, and then successfully commercialize, product candidates, either alone or with collaborators. We have not yet developed and commercialized any product candidates, and we may not be able to do so, alone or with collaborators.

Our research and development programs may not lead to the successful identification, development or commercialization of any products.

The success of our business depends primarily upon our ability to identify, develop and commercialize products using our genome editing technology. With the exception of our CD19, CD19B and BCMA product candidates, all current product candidates and product development programs are still in the discovery or preclinical stages. We may be unsuccessful in advancing those product candidates into clinical development or in identifying any developing additional product candidates. Our ability to identify and develop product candidates is subject to the numerous risks associated with preclinical and early stage biotechnology development activities, including that:

- the use of ARCUS may be ineffective in identifying additional product candidates;
- we may not be able to assemble sufficient resources to acquire or discover additional product candidates;
- we may not be able to enter into collaborative arrangements to facilitate development of product candidates;
- competitors may develop alternatives that render our product candidates obsolete or less attractive;
- our product candidates may be covered by third parties' patents or other exclusive rights;
- the regulatory pathway for a product candidate may be too complex, expensive or otherwise difficult to navigate successfully; or
- our product candidates may be shown to not be effective, have harmful side effects or otherwise pose risks not outweighed by such product candidate's benefits or have other characteristics that may make the products impractical to manufacture, unlikely to receive any required marketing approval, unlikely to generate sufficient market demand or otherwise not achieve profitable commercialization.

Our product candidates currently being investigated in clinical trials, or that are expected to be investigated in clinical trials, and other product candidates we may identify may never be approved. Failure to successfully identify and develop new product candidates and obtain regulatory approvals for our products would have a material adverse effect on our business and financial condition and could cause us to cease operations.

If our product candidates do not achieve projected development milestones or commercialization in the announced or expected timeframes, the further development or commercialization of such product candidates may be delayed, and our business will be harmed.

We sometimes estimate, or may in the future estimate, the timing of the accomplishment of various scientific, clinical, manufacturing, regulatory and other product development objectives. These milestones may include our expectations regarding the commencement or completion of scientific studies or clinical trials, the submission of regulatory filings, the receipt of marketing approval or the realization of other commercialization objectives. The achievement of many of these milestones may be outside of our control. All of these milestones are based on a variety of assumptions, including assumptions regarding capital resources, constraints and priorities, progress of and results from development activities, the receipt of key regulatory approvals or actions, and other factors, including without limitation, impacts resulting from the COVID-19 pandemic and its variants, any of which may cause the timing of achievement of the milestones to vary considerably from our estimates. If we or our collaborators fail to achieve announced milestones in the expected timeframes, the commercialization of the product candidates may be delayed, our credibility may be undermined, our business and results of operations may be harmed, and the trading price of our common stock may decline.

Adverse public perception of genome editing may negatively impact the developmental progress or commercial success of products that we develop alone or with collaborators.

The developmental and commercial success of our current product candidates, or any that we develop alone or with collaborators in the future, will depend in part on public acceptance of the use of genome editing technology for the prevention or treatment of human diseases. Adverse public perception of applying genome editing technology for these purposes may negatively impact our ability to raise capital or enter into strategic agreements for the development of product candidates.

Any therapeutic product candidates may involve editing the human genome. The commercial success of any such potential therapeutic products, if successfully developed and approved, may be adversely affected by claims that genome editing is unsafe, unethical or immoral. This may lead to unfavorable public perception and the inability of any therapeutic product candidates to gain the acceptance of the public or the medical community. Unfavorable public perceptions may also adversely impact our or our collaborators' ability to enroll clinical trials for therapeutic product candidates. Moreover, success in commercializing any therapeutic product candidates that receive regulatory approval will depend upon physicians prescribing, and their patients being willing to receive, treatments that involve the use of such product candidates in lieu of, or in addition to, existing treatments with which they are already familiar and for which greater clinical data may be available. Publicity of any adverse events in, or unfavorable results of, preclinical studies or clinical trials for any current or future product candidates, including, without limitation, patient deaths, or with respect to the studies or trials of our competitors or of academic researchers utilizing genome editing technologies, even if not ultimately attributable to our technology or product candidates, could negatively influence public opinion. Negative public perception about the use of genome editing technology in human therapeutics, whether related to our technology or a competitor's technology, could result in increased governmental regulation, delays in the development and commercialization of product candidates or decreased demand for the resulting products, any of which may have a negative impact on our business and financial condition.

We face significant competition in industries experiencing rapid technological change, and there is a possibility that our competitors may achieve regulatory approval before us or develop product candidates or treatments that are safer or more effective than ours, which may harm our financial condition and our ability to successfully market or commercialize any of our product candidates.

The development and commercialization of new drug products is highly competitive, and the genome editing field is characterized by rapidly changing technologies, significant competition and a strong emphasis on intellectual property. We will face competition with respect to our current and future therapeutic product candidates from major pharmaceutical companies, specialty pharmaceutical companies and biotechnology companies worldwide. Potential competitors also include academic institutions, government agencies and other public and private research organizations that conduct research, seek patent protection and establish collaborative arrangements for research, development, manufacturing and commercialization of products.

There are a number of large pharmaceutical and biotechnology companies that currently market and sell products or are pursuing the development of products for the treatment of the disease indications for which we have research programs. Some of these competitive products and therapies are based on scientific approaches that are similar to our approach, and others are based on entirely different approaches. We principally compete with others developing and utilizing genome editing technology in the human health sector, including companies such as Allogene Therapeutics, Inc., Alnylam Pharmaceuticals, Inc., Beam Therapeutics, Inc, Caribou Biosciences, Inc., Cellectis S.A., CRISPR Therapeutics, AG, Dicerna Pharmaceuticals, Inc., Editas Medicine, Inc., Intellia Therapeutics, Inc., Sangamo Therapeutics, Inc., and Verve Therapeutics, Inc. Several companies, including Novartis Pharmaceuticals Corp., Celgene Corp., and Gilead Sciences, Inc. have obtained FDA approval for autologous immunotherapies, and a number of companies, including Cellectis S.A., Allogene Therapeutics and CRISPR Therapeutics AG, are pursuing allogeneic immunotherapies. We expect that our operations focused on developing products for *in vivo* gene correction will face substantial competition from others

focusing on gene therapy treatments, especially those that may focus on conditions that our product candidates target. Moreover, any human therapeutics products that we develop alone or with collaborators will compete with existing standards of care for the diseases and conditions that our product candidates target and other types of treatments, such as small molecule, antibody or protein therapies.

Many of our current or potential competitors, either alone or with their collaborators, have significantly greater financial resources and expertise in research and development, manufacturing, preclinical testing, conducting clinical trials, obtaining regulatory approvals and marketing approved products than we do. Mergers and acquisitions in the pharmaceutical and biotechnology industries may result in even more resources being concentrated among a smaller number of our competitors. Smaller or early-stage companies may also prove to be significant competitors, particularly through collaborative arrangements with large and established companies. These competitors also compete with us in recruiting and retaining qualified scientific and management personnel and establishing clinical trial sites and patient registration for clinical trials, as well as in acquiring technologies complementary to, or necessary for, our programs. Our commercial opportunity could be reduced or eliminated if our competitors develop and commercialize products that are safer, more effective, have fewer or less severe side effects, are more convenient or are less expensive than any products we develop alone or with collaborators or that would render any such products obsolete or non-competitive. Our competitors also may obtain FDA or other regulatory approval for their products more rapidly than we or our collaborators may obtain approval for any that we develop, which could result in our competitors establishing a strong market position before we are able to enter the market. Additionally, technologies developed by our competitors may render our product candidates uneconomical or obsolete, and we or our collaborators may not be successful in marketing any product candidates we may develop against competitors. The availability of our competitors' products could limit the demand, and the price we are able to charge, for any products that we develop alone or with collaborators.

Our future profitability, if any, will depend in part on our ability and the ability of our collaborators to commercialize any products that we or our collaborators may develop in markets throughout the world. Commercialization of products in various markets could subject us to risks and uncertainties, including:

- obtaining, on a country-by-country basis, the applicable marketing authorization from the competent regulatory authority;
- the burden of complying with complex and changing regulatory, tax, accounting, labor and other legal requirements in each jurisdiction that we or our collaborators pursue;
- reduced protection for intellectual property rights;
- differing medical practices and customs affecting acceptance in the marketplace;
- import or export licensing requirements;
- governmental controls, trade restrictions or changes in tariffs;
- economic weakness, including inflation, or political instability in particular foreign economies and markets;
- production shortages resulting from any events affecting raw material supply or manufacturing capabilities abroad;
- longer accounts receivable collection times;
- longer lead times for shipping;
- language barriers;
- foreign currency exchange rate fluctuations;
- foreign reimbursement, pricing and insurance regimes; and
- the interpretation of contractual provisions governed by foreign laws in the event of a contract dispute.

We have limited or no prior experience in these areas, and our collaborators may have limited experience in these areas. Failure to successfully navigate these risks and uncertainties may limit or prevent market penetration for any products that we or our collaborators may develop, which would limit their commercial potential and our revenues.

Product liability lawsuits against us could cause us to incur substantial liabilities and could limit commercialization of any products that we develop alone or with collaborators.

We face an inherent risk of product liability and professional indemnity exposure related to the testing in clinical trials of our product candidates. We will face an even greater liability risk if we commercially sell any products that we or our collaborators may develop for human use. Manufacturing defects, errors in product distribution or storage processes, improper administration or application and known or unknown side effects of product usage may result in liability claims against us or third parties with which we have

relationships. These actions could include claims resulting from acts by our collaborators, licensees and subcontractors over which we have little or no control.

For example, our liability could be sought by patients participating in clinical trials for potential therapeutic product candidates as a result of unexpected side effects, improper product administration or the deterioration of a patient's condition, patient injury or even death. Criminal or civil proceedings might be filed against us by patients, regulatory authorities, biopharmaceutical companies and any other third party using or marketing any product candidates or products that we develop alone or with collaborators. On occasion, large judgments have been awarded in class action lawsuits based on products that had unanticipated adverse effects. If we cannot successfully defend ourselves against claims that product candidates or products we develop alone or with collaborators caused harm, we could incur substantial liabilities.

Regardless of merit or eventual outcome, liability claims may result in:

- significant time and costs to defend the related litigation;
- injury to our reputation and significant negative media attention;
- diversion of management's attention from pursuing our strategy;
- withdrawal of clinical trial participants;
- delay or termination of clinical trials;
- decreased demand for any products that we develop alone or with collaborators;
- substantial monetary awards to trial participants or patients;
- product recalls, withdrawals or labeling, marketing or promotional restrictions;
- loss of revenue; and
- the inability to further develop or commercialize any products.

Although the clinical trial process is designed to identify and assess potential side effects, clinical development does not always fully characterize the safety and efficacy profile of a new medicine, and it is always possible that a drug or biologic, even after regulatory approval, may exhibit unforeseen side effects. If our product candidates were to cause adverse side effects during clinical trials or after approval, we may be exposed to substantial liabilities. Physicians and patients may not comply with any warnings that identify known potential adverse effects and patients who should not use our product candidates. If any of our product candidates are approved for commercial sale, we will be highly dependent upon consumer perceptions of us and the safety and quality of such products. We could be adversely affected if we are subject to negative publicity associated with illness or other adverse effects resulting from patients' use or misuse of such products or any similar products distributed by other companies.

Although we maintain product liability insurance coverage, it may not be adequate to cover all liabilities that we may incur. We anticipate that we will need to increase our insurance coverage if we or our collaborators successfully commercialize any products. Insurance coverage is increasingly expensive. We may not be able to maintain insurance coverage at a reasonable cost or in an amount adequate to satisfy any liabilities to which we may become subject.

Additional Risks Related to the Identification, Development and Commercialization of Our Therapeutic Product Candidates

The regulatory landscape that will apply to development of therapeutic product candidates by us or our collaborators is rigorous, complex, uncertain and subject to change, which could result in delays or termination of development of such product candidates or unexpected costs in obtaining regulatory approvals.

Regulatory requirements governing products created with genome editing technology or involving gene therapy treatment have changed frequently and will likely continue to change in the future. Approvals by one regulatory agency may not be indicative of what any other regulatory agency may require for approval, and there has historically been substantial, and sometimes uncoordinated, overlap in those responsible for regulation of gene therapy products, cell therapy products and other products created with genome editing technology. For example, in the United States, the FDA has established the Office of Tissues and Advanced Therapies within its Center for Biologics Evaluation and Research ("CBER") to consolidate the review of gene therapy and related products, and the Cellular, Tissues, and Gene Therapies Advisory Committee to advise CBER on its review. Our product candidates will need to meet safety and efficacy standards applicable to any new biologic under the regulatory framework administered by the FDA.

In addition to the submission of an IND to the FDA, before initiation of a clinical trial in the United States, certain human clinical trials subject to the NIH Guidelines are subject to review and oversight by an institutional biosafety committee ("IBC"), a local

institutional committee that reviews and oversees research utilizing recombinant or synthetic nucleic acid molecules at that institution. The IBC assesses the safety of the research and identifies any potential risk to public health or the environment, and such review may result in some delay before initiation of a clinical trial. While the NIH Guidelines are not mandatory unless the research in question is being conducted at or sponsored by institutions receiving NIH funding of recombinant or synthetic nucleic acid molecule research, many companies and other institutions not otherwise subject to the NIH Guidelines voluntarily follow them. We are subject to significant regulatory oversight by the FDA, and in addition to the government regulators, the applicable IBC and IRB of each institution at which we or our collaborators conduct clinical trials of our product candidates, or a central IRB if appropriate, would need to review and approve the proposed clinical trial.

The same applies in the EU. The EMA has a Committee for Advanced Therapies ("CAT") that is responsible for assessing the quality, safety and efficacy of ATMPs. ATMPs include gene therapy medicine, somatic-cell therapy medicines and tissue-engineered medicines. The role of the CAT is to prepare a draft opinion on an application for marketing authorization for a gene therapy medicinal product candidate that is submitted to the EMA. In the EU, the development and evaluation of a gene therapy medicinal product must be considered in the context of the relevant EU guidelines. The EMA may issue new guidelines concerning the development and marketing authorization for gene therapy medicinal products and require that we comply with these new guidelines. Similarly complex regulatory environments exist in other jurisdictions in which we might consider seeking regulatory approvals for our product candidates, further complicating the regulatory landscape. As a result, the procedures and standards applied to gene therapy products and cell therapy products may be applied to any of our gene therapy or genome editing product candidates, but that remains uncertain at this point.

The clinical trial requirements of the FDA, the EMA and other regulatory authorities and the criteria these regulators use to evaluate the safety and efficacy of a product candidate vary substantially according to the type, complexity, novelty and intended use and market of the potential products. The regulatory approval process for product candidates created with novel genome editing technology such as ours can be more lengthy, rigorous and expensive than the process for other better known or more extensively studied product candidates and technologies. Since we are developing novel treatments for diseases in which there is little clinical experience with new endpoints and methodologies, there is heightened risk that the FDA, the EMA or comparable regulatory bodies may not consider the clinical trial endpoints to provide clinically meaningful results, and the resulting clinical data and results may be more difficult to analyze. This may be a particularly significant risk for many of the genetically defined diseases for which we may develop product candidates alone or with collaborators due to small patient populations for those diseases, and designing and executing a rigorous clinical trial with appropriate statistical power is more difficult than with diseases that have larger patient populations. Regulatory agencies administering existing or future regulations or legislation may not allow production and marketing of products utilizing genome editing technology in a timely manner or under technically or commercially feasible conditions. Even if our product candidates obtain required regulatory approvals, such approvals may later be withdrawn as a result of changes in regulations or the interpretation of regulations by applicable regulatory agencies.

Changes in applicable regulatory guidelines may lengthen the regulatory review process for our product candidates, require additional studies or trials, increase development costs, lead to changes in regulatory positions and interpretations, delay or prevent approval and commercialization of such product candidates, or lead to significant post-approval limitations or restrictions. Additionally, adverse developments in clinical trials conducted by others of gene therapy products or products created using genome editing technology, such as products developed through the application of a CRISPR/Cas9 technology, or adverse public perception of the field of genome editing, may cause the FDA, the EMA and other regulatory bodies to revise the requirements for approval of any product candidates we may develop or limit the use of products utilizing genome editing technologies, either of which could materially harm our business. Furthermore, regulatory action or private litigation could result in expenses, delays or other impediments to our research programs or the development or commercialization of current or future product candidates.

As we advance product candidates alone or with collaborators, we will be required to consult with these regulatory and advisory groups and comply with all applicable guidelines, rules and regulations. If we fail to do so, we or our collaborators may be required to delay or terminate development of such product candidates. Delay or failure to obtain, or unexpected costs in obtaining, the regulatory approval necessary to bring a product candidate to market could decrease our ability to generate sufficient product revenue to maintain our business.

We may not be able to submit INDs to the FDA or CTAs to comparable foreign authorities to commence additional clinical trials on the timelines we expect, and even if we are able to, the FDA or comparable foreign authorities may not permit us to proceed.

We plan to submit INDs and CTAs to enable us to conduct clinical trials for additional product candidates in the future, and we expect to file IND amendments to enable us to conduct additional clinical trials under existing INDs. We cannot be sure that submission of an IND, CTA, or IND amendment will result in us being allowed to proceed with clinical trials, or that, once begun, issues will not arise that could result in the suspension or termination such clinical trials. The manufacturing of allogeneic CAR T cell therapy and *in vivo* therapies for genetic and infectious diseases remains an emerging and evolving field. Accordingly, we expect CMC related topics, including product specifications, will be a focus of IND and CTA reviews, which may delay receipt of authorization to proceed under

INDs and CTAs. Additionally, even if such regulatory authorities agree with the design and implementation of the clinical trials set forth in an IND or CTA, we cannot guarantee that such regulatory authorities will not change their requirements in the future. Similar risks may exist in foreign jurisdictions where we intend to conduct clinical trials.

The regulatory approval processes of the FDA and comparable foreign authorities are lengthy, time consuming and inherently unpredictable, and if we are ultimately unable to obtain regulatory approval for our product candidates, our business will be substantially harmed.

We and any collaborators are not permitted to commercialize, market, promote or sell any product candidate in the United States without obtaining marketing approval from the FDA. Foreign regulatory authorities impose similar requirements. The time required to obtain approval by the FDA and comparable foreign authorities is unpredictable, but typically takes many years following the commencement of clinical trials and depends upon numerous factors, including substantial discretion of the regulatory authorities and sufficient resources at the FDA or foreign regulatory authorities. In addition, approval policies, regulations or the type and amount of clinical data necessary to gain approval may change during the course of a product candidate's clinical development and may vary among jurisdictions. To date, we have not submitted a biologics license application ("BLA") or other marketing authorization application to the FDA or similar drug approval submissions to comparable foreign regulatory authorities for any product candidate. We and any collaborators must complete additional preclinical or nonclinical studies and clinical trials to demonstrate the safety and efficacy of our product candidates in humans to the satisfaction of the regulatory authorities before we will be able to obtain these approvals.

Our product candidates could fail to receive regulatory approval for many reasons, including the following:

- the FDA or comparable foreign regulatory authorities may disagree with the design or implementation of our or our collaborators' clinical trials;
- we or our collaborators may be unable to demonstrate to the satisfaction of the FDA or comparable foreign regulatory authorities that a product candidate is safe and effective for its proposed indication;
- the results of clinical trials may not meet the level of statistical significance required by the FDA or comparable foreign regulatory authorities for approval;
- we or our collaborators may be unable to demonstrate that a product candidate's clinical and other benefits outweigh its safety risks;
- the FDA or comparable foreign regulatory authorities may disagree with our or our collaborators' interpretation of data from preclinical studies or clinical trials;
- the data collected from clinical trials of product candidates may not be sufficient to support the submission of a BLA or other submission or to obtain regulatory approval in the United States or elsewhere;
- the FDA or comparable foreign regulatory authorities may fail to approve our manufacturing processes or facilities or those of third-party manufacturers with which we or our collaborators contract for clinical and commercial supplies;
- the FDA or comparable foreign regulatory authorities may fail to approve the companion diagnostics we may contemplate developing with collaborators; and
- the approval policies or regulations of the FDA or comparable foreign regulatory authorities may significantly change in a manner rendering our or our collaborators' clinical data insufficient for approval.

This lengthy approval process as well as the unpredictability of future clinical trial results may result in our failing to obtain regulatory approval to market our product candidates, which would significantly harm our business, results of operations and prospects.

In addition, even if we were to obtain approval, regulatory authorities may approve any of our product candidates for fewer or more limited indications than we request, may impose significant limitations in the form of narrow indications, warnings, or a REMS or similar risk management measures. Regulatory authorities may not approve the price we or our collaborators intend to charge for products we may develop, may grant approval contingent on the performance of costly post-marketing clinical trials, or may approve a product candidate with a label that does not include the labeling claims necessary or desirable for the successful commercialization of that product candidate. Any of the foregoing scenarios could materially harm the commercial prospects for our product candidates.

Clinical trials are difficult to design and implement, expensive, time-consuming and involve an uncertain outcome, and the inability to successfully and timely conduct clinical trials and obtain regulatory approval for our product candidates would substantially harm our business.

Clinical testing is expensive and usually takes many years to complete, and its outcome is inherently uncertain. Failure can occur at any time during the clinical trial process, and product candidates in later stages of clinical trials may fail to show the desired safety and efficacy traits despite having progressed through preclinical studies and initial clinical trials. We have initiated a Phase 1/2a clinical trial in patients with R/R NHL or R/R B-ALL, a Phase 1 clinical trial in patients with NHL and a Phase 1/2a clinical trial in subjects with R/R multiple myeloma. We do not know whether any current or planned clinical trials will need to be redesigned, recruit and enroll patients on time or be completed on schedule, or at all. Clinical trials have been and may in the future be delayed, suspended or terminated for a variety of reasons, including in connection with:

- the inability to generate sufficient preclinical, toxicology or other *in vivo* or *in vitro* data to support the initiation of clinical trials;
- applicable regulatory authorities disagreeing as to the design or implementation of the clinical trials;
- obtaining regulatory authorization to commence a trial;
- reaching an agreement on acceptable terms with prospective contract research organizations ("CROs") and clinical trial sites, the terms of which can be subject to extensive negotiation and may vary significantly among different CROs and trial sites;
- obtaining IRB or ethics committee approval at each site;
- developing and validating the companion diagnostic to be used in a clinical trial, if applicable;
- insufficient or inadequate supply or quality of product candidates or other materials, including identification of lymphocyte donors meeting regulatory standards necessary for use in clinical trials, or delays in sufficiently developing, characterizing or controlling a manufacturing process suitable for clinical trials;
- recruiting and retaining enough suitable patients to participate in a trial;
- having enough patients complete a trial or return for post-treatment follow-up;
- adding a sufficient number of clinical trial sites;
- inspections of clinical trial sites or operations by applicable regulatory authorities, or the imposition of a clinical hold;
- clinical sites deviating from trial protocol or dropping out of a trial;
- the inability to demonstrate the efficacy and benefits of a product candidate;
- discovering that product candidates have unforeseen safety issues, undesirable side effects or other unexpected characteristics;
- addressing patient safety concerns that arise during the course of a trial;
- receiving untimely or unfavorable feedback from applicable regulatory authorities regarding the trial or requests from regulatory authorities to modify the design of a trial;
- non-compliance with applicable regulatory requirements by us or third parties or changes in such regulations or administrative actions;
- suspensions or terminations by IRBs of the institutions at which such trials are being conducted, by the Data Safety Monitoring Board ("DSMB") for such trial or by the FDA or other regulatory authorities due to a number of factors, including those described above;
- third parties being unable or unwilling to satisfy their contractual obligations to us;
- changes in our financial priorities, greater than anticipated costs of completing a trial or our inability to continue funding the trial; or
- unforeseen events, such as natural or manmade disasters, public health emergencies, such as the COVID-19 pandemic and its variants, which has and may continue to impact our operations, or other natural catastrophic events.

Many of the factors that cause, or lead to, a delay in the commencement or completion of clinical trials may also ultimately lead to the denial of regulatory approval of our product candidates. Additionally, we or our collaborators may experience unforeseen events during or resulting from clinical trials that could delay or prevent receipt of marketing approval for or commercialization of product candidates. For example, clinical trials of product candidates may produce negative, inconsistent or inconclusive results, and we may decide, or regulators may require us, to conduct additional clinical trials or abandon development programs. Regulators may also revise the requirements for approving the product candidates, or such requirements may not be as we anticipate. If we or our collaborators are required to conduct additional clinical trials or other testing of product candidates beyond those that we or our collaborators currently contemplate, if we or our collaborators are unable to successfully complete clinical trials or other testing of such product candidates, if the results of these trials or tests are not positive or are only modestly positive or if there are safety concerns, we may:

- incur unplanned costs;
- be delayed in obtaining or fail to obtain marketing approval for product candidates;
- obtain marketing approval in some countries and not in others;
- obtain marketing approval for indications or patient populations that are not as broad as intended or desired;
- obtain marketing approval with labeling that includes significant use or distribution restrictions or safety warnings, including boxed warnings;
- be subject to additional post-marketing testing requirements;
- be subject to changes in the way the product is administered;
- have regulatory authorities withdraw or suspend their approval of the product or impose restrictions on its distribution;
- be sued; or
- experience damage to our reputation.

If we or our collaborators experience delays in the commencement or completion of our clinical trials, or if we or our collaborators terminate a clinical trial prior to completion, we may experience increased costs, have difficulty raising capital and/or be required to slow down the development and approval process timelines. Furthermore, the product candidates that are the subject of such trials may never receive regulatory approval, and their commercial prospects and our ability to generate product revenues from them could be impaired or not realized at all.

Moreover, principal investigators for our clinical trials may serve as scientific advisors or consultants to us from time to time and receive compensation in connection with such services. Under certain circumstances, we may be required to report some of these relationships to the FDA or comparable foreign regulatory authorities. The FDA or comparable foreign regulatory authorities may conclude that a financial relationship between us and a principal investigator has created a conflict of interest or otherwise affected interpretation of the study. The FDA or comparable foreign regulatory authorities may therefore question the integrity of the data generated at the applicable clinical trial site and the utility of the clinical trial itself may be jeopardized. This could result in a delay in approval, or rejection, of our marketing applications by the FDA or comparable foreign regulatory authorities, as the case may be, and may ultimately lead to the denial of marketing approval of one or more of our product candidates.

In addition, the FDA's and other regulatory authorities' policies with respect to clinical trials may change and additional government regulations may be enacted. For instance, the regulatory landscape related to clinical trials in the EU recently evolved. The EU CTR which was adopted in April 2014 and repeals the EU Clinical Trials Directive, became applicable on January 31, 2022. While the Clinical Trials Directive required a separate CTA to be submitted in each member state, to both the competent national health authority and an independent ethics committee, the CTR introduces a centralized process and only requires the submission of a single application to all member states concerned. The CTR allows sponsors to make a single submission to both the competent authority and an ethics committee in each member state, leading to a single decision per member state. The assessment procedure of the CTA has been harmonized as well, including a joint assessment by all member states concerned, and a separate assessment by each member state with respect to specific requirements related to its own territory, including ethics rules. Each member state's decision is communicated to the sponsor via the centralized EU portal. Once the CTA is approved, clinical study development may proceed. The CTR foresees a three-year transition period. The extent to which ongoing and new clinical trials will be governed by the CTR varies. For clinical trials whose CTA was made under the Clinical Trials Directive before January 31, 2022, the Clinical Trials Directive will continue to apply on a transitional basis for three years. Additionally, sponsors may still choose to submit a CTA under either the Clinical Trials Directive or the CTR until January 31, 2023 and, if authorized, those will be governed by the Clinical Trials Directive until January 31, 2025. By that date, all ongoing trials will become subject to the provisions of the CTR.

It is currently unclear to what extent the UK will seek to align its regulations with the EU. The UK regulatory framework in relation to clinical trials is derived from existing EU legislation (as implemented into UK law, through secondary legislation).

On January 17, 2022, the UK MHRA launched an eight-week consultation on reframing the UK legislation for clinical trials. The consultation closes on 14 March 2022 and aims to streamline clinical trials approvals, enable innovation, enhance clinical trials transparency, enable greater risk proportionality, and promote patient and public involvement in clinical trials. The outcome of the consultation will be closely watched and will determine whether the UK chooses to align with the regulation or diverge from it to maintain regulatory flexibility. A decision by the UK not to closely align its regulations with the new approach that will be adopted in the EU may have an effect on the cost of conducting clinical trials in the UK as opposed to other countries and/or make it harder to seek a marketing authorization in the EU for our product candidates on the basis of clinical trials conducted in the UK.

If we are slow or unable to adapt to changes in existing requirements or the adoption of new requirements or policies governing clinical trials, our development plans may also be impacted.

Any product candidates that we or our collaborators may develop will be novel and may be complex and difficult to manufacture, and if we experience manufacturing problems, it could result in delays in development and commercialization of such product candidates or otherwise harm our business.

Our product candidates involve or will involve novel genome editing technology and will require processing steps that are more complex than those required for most small molecule drugs, resulting in a relatively higher manufacturing cost. Moreover, unlike small molecules, the physical and chemical properties of biologics generally cannot be fully characterized. As a result, assays of the finished product may not be sufficient to ensure that such product will perform in the intended manner. Although we intend to employ multiple steps to control the manufacturing process, we may experience manufacturing issues with any of our product candidates that could cause production interruptions, including contamination, equipment or reagent failure, improper installation or operation of equipment, facility contamination, raw material shortages or contamination, natural disasters, disruption in utility services, human error, disruptions in the operations of our suppliers, inconsistency in cell growth and variability in product characteristics. We may encounter problems achieving adequate quantities and quality of clinical-grade materials that meet FDA, EMA or other comparable applicable standards or specifications with consistent and acceptable production yields and costs. For example, the FDA has required us to conduct testing of our allogeneic CAR T cell product candidates for the presence of certain human viruses prior to release of such products for clinical use. If the FDA concludes that further such viral testing of our product candidates is required and that any lots testing positive may not be used in clinical trials, we may need to produce new clinical trial materials, which could delay our clinical trials and result in higher manufacturing costs. Even minor deviations from normal manufacturing processes could result in reduced production yields, product defects and other supply disruptions. If microbial, viral or other contaminations are discovered in our product candidates or in the manufacturing facilities in which such product candidates are made, such manufacturing facilities may need to be closed for an extended period of time to investigate and remedy the contamination. Our manufacturing process for any allogeneic CAR T cell product candidate that we develop alone or with collaborators will be susceptible to product loss or failure due to the quality of the raw materials, failure of the products to meet specifications, logistical issues associated with the collection of white blood cells, or starting material, from healthy third-party donors, shipping such material to the manufacturing site, ensuring standardized production batch-to-batch in the context of mass production, freezing the manufactured product, shipping the final product globally, thawing and infusing patients with such product. Problems with the manufacturing process, even minor deviations from the normal process, could result in product defects or manufacturing failures that result in lot failures, delays in initiating or completing clinical trials, product recalls, product liability claims or insufficient inventory.

As product candidates are developed through preclinical to late-stage clinical trials towards approval and commercialization, we expect that various aspects of the development program, such as manufacturing methods, may be altered along the way in an effort to help optimize processes and results. Such changes carry the risk that they will not achieve the intended objectives, and any of these changes could cause our product candidates to perform differently and affect the results of future clinical trials or our reliance on results of trials that have previously been conducted using the product candidate in its previous form. If the manufacturing process is changed during the course of product development, we or our collaborators may be required to repeat some or all of the previously conducted trials or conduct additional bridging trials, which could increase our costs and delay or impede our ability to obtain marketing approval.

We expect our manufacturing strategy for one or more of our product candidates may involve the use of contract manufacturing organizations (“CMOs”) as well as our dedicated manufacturing facility, MCAT. The facilities used by us and our contract manufacturers to manufacture therapeutic product candidates must be evaluated for the manufacture of our product candidates by the FDA or foreign regulatory authorities pursuant to inspections that will be conducted after we submit a BLA to the FDA, or similar foreign applications to foreign regulatory authorities. We do not control the manufacturing process of our contract manufacturers and are dependent on their compliance with cGMP or similar foreign requirements for their manufacture of our product candidates. We may establish multiple manufacturing facilities as we expand our commercial footprint to multiple geographies, which will be costly and time consuming and may lead to regulatory delays. Even if we are successful, our manufacturing capabilities could be affected by cost-overruns, potential problems with scale-out, process reproducibility, stability issues, lot inconsistency, timely availability of reagents or raw materials, unexpected delays, equipment failures, labor shortages, natural disasters, utility failures, regulatory issues

and other factors that could prevent us from realizing the intended benefits of our manufacturing strategy and have a material adverse effect on our business.

The FDA, the EMA and other foreign regulatory authorities may require us to submit samples of any lot of any product that may receive approval together with the protocols showing the results of applicable tests at any time. Under some circumstances, the FDA, the EMA or other foreign regulatory authorities may require that we not distribute a lot until the relevant agency authorizes its release. Slight deviations in the manufacturing process, including those affecting quality attributes and stability, may result in unacceptable changes in the product that could result in lot failures or product recalls. Lot failures or product recalls could cause us or our collaborators to delay product launches or clinical trials, which could be costly to us and otherwise harm our business. Problems in our manufacturing process also could restrict our or our collaborators' ability to meet market demand for products.

Any problems in our manufacturing process or facilities could make us a less attractive collaborator for potential partners, including larger pharmaceutical companies and academic research institutions, which could limit our access to additional attractive development opportunities.

We will rely on donors of T cells to manufacture product candidates from our allogeneic CAR T immunotherapy platform, and if we do not obtain an adequate supply of T cells from qualified donors, development of those product candidates may be adversely impacted.

We are developing a pipeline of allogeneic T cell product candidates that are engineered from healthy donor T cells, which vary in type and quality. This variability in type and quality of a donor's T cells makes producing standardized product candidates more difficult and makes the development and commercialization pathway of those product candidates more uncertain. We have developed a screening process designed to enhance the quality and consistency of T cells used in the manufacture of our CAR T cell product candidates. If we are unable to identify and obtain T cells from donors that satisfy our criteria in sufficient quantity, to obtain such cells in a timely manner or to address variability in donor T cells, development of our CAR T cell product candidates may be delayed or there may be inconsistencies in the product candidates we produce, which could negatively impact development of such product candidates, harm our reputation and adversely impact our business and prospects.

Failure to achieve operating efficiencies from MCAT may require us to devote additional resources and management time to manufacturing operations and may delay our product development timelines.

We have leased approximately 33,800 square feet of space for MCAT at a location approximately seven miles from our headquarters in Durham, North Carolina. We use this manufacturing center to create clinical trial material for certain of our current and planned clinical trials. We may not experience the anticipated operating efficiencies in our own manufacturing. Any delays in manufacturing may disrupt or delay the supply of our product candidates if we have not maintained a sufficient back-up supply of such product candidates through third-party manufacturers. Moreover, changing manufacturing facilities may also require that we or our collaborators conduct additional studies, make notifications to regulatory authorities, make additional filings to regulatory authorities, and obtain regulatory authority approval for the new facilities, which may be delayed or which we may never receive. We are also required to comply with the FDA's and applicable foreign regulatory authorities' GMP requirements for the production of product candidates for clinical trials and, if approved, commercial supply, and will be subject to FDA and comparable foreign regulatory authority inspection. These requirements include the qualification and validation of our manufacturing equipment and processes. We may not be able to develop, acquire or maintain the internal expertise and resources necessary for compliance with these requirements. If we fail to achieve the operating efficiencies that we anticipate, our manufacturing and operating costs may be greater than expected, which could have a material adverse impact on our operating results.

We also may encounter problems hiring and retaining the experienced scientific, quality-control and manufacturing personnel needed to operate our manufacturing processes. If we experience unanticipated employee shortage or turnover in any of these areas, we may not be able to effectively manage our ongoing manufacturing operations and we may not achieve the operating efficiencies that we anticipate from MCAT, which may negatively affect our product development timeline or result in difficulties in maintaining compliance with applicable regulatory requirements.

Any such problems could result in the delay, prevention or impairment of clinical development and commercialization of our product candidates.

Any delays or difficulties in our or our collaborators ability to enroll patients in clinical trials, could delay or prevent receipt of regulatory approvals.

We or our collaborators may not be able to initiate or continue clinical trials on a timely basis or at all for any product candidates we or our collaborators identify or develop if we or our collaborators are unable to locate and enroll a sufficient number of eligible patients to participate in the trials as required by applicable regulations or as needed to provide appropriate statistical power for a

given trial. Additionally, some of our competitors may have ongoing clinical trials for product candidates that would treat the same indications as one or more of our product candidates, and patients who would otherwise be eligible for our clinical trials may instead enroll in our competitors' clinical trials.

Patient enrollment may also be affected by many factors, including:

- severity and difficulty of diagnosing of the disease under investigation;
- the difficulty in recruiting and/or identifying eligible patients suffering from rare diseases being evaluated under our trials;
- size of the patient population and process for identifying subjects;
- eligibility and exclusion criteria for the trial in question, including unforeseen requirements by the FDA or other regulatory authorities that we restrict one or more entry criteria for the study for safety reasons;
- our or our collaborators' ability to recruit clinical trial investigators with the appropriate competencies and experience;
- design of the trial protocol;
- availability and efficacy of approved medications or therapies, or other clinical trials, for the disease or condition under investigation;
- perceived risks and benefits of the product candidate under trial or testing, or of the application of genome editing to human indications;
- availability of genetic testing for potential patients;
- efforts to facilitate timely enrollment in clinical trials;
- patient referral practices of physicians;
- ability to obtain and maintain subject consent;
- risk that enrolled subjects will drop out before completion of the trial;
- ability to monitor patients adequately during and after treatment;
- proximity and availability of clinical trial sites for prospective patients; and
- unforeseen events, such as natural or manmade disasters, public health emergencies, such as the COVID-19 pandemic and its variants which has and may continue to impact our operations, or other natural catastrophic events.

We expect that some of our product candidates will focus on rare genetically defined diseases with limited patient pools from which to draw for enrollment in clinical trials. The eligibility criteria of our clinical trials will further limit the pool of available trial participants. In addition to the factors identified above, patient enrollment in any clinical trials we or our collaborators may conduct may be adversely impacted by any negative outcomes our competitors may experience, including adverse side effects, clinical data showing inadequate efficacy or failures to obtain regulatory approval.

Furthermore, our or our collaborators' ability to successfully initiate, enroll and conduct a clinical trial outside the United States is subject to numerous additional risks, including:

- difficulty in establishing or managing relationships with CROs and physicians;
- differing standards for the conduct of clinical trials;
- differing standards of care for patients with a particular disease;
- an inability to locate qualified local consultants, physicians and partners; and
- the potential burden of complying with a variety of foreign laws, medical standards and regulatory requirements, including the regulation of pharmaceutical and biotechnology products and treatments.

Enrollment delays in clinical trials, including those due to the COVID-19 pandemic and its variants, may result in increased development costs for any of our product candidates, which may cause the value of our company to decline and limit our ability to obtain additional financing. If we or our collaborators have difficulty enrolling a sufficient number of patients to conduct clinical trials as planned, we may need to delay, limit or terminate ongoing or planned clinical trials, any of which may have an adverse effect on our results of operations and prospects.

Results of preclinical studies and early clinical trials of product candidates may not be predictive of results of later studies or trials. Our product candidates may not have favorable results in later clinical trials, if any, or receive regulatory approval.

Preclinical and clinical drug development is expensive and can take many years to complete, and its outcome is inherently uncertain. Failure can occur at any time during the preclinical study or clinical trial process. Despite promising preclinical or clinical results, any product candidate can unexpectedly fail at any stage of preclinical or clinical development. The historical failure rate for product candidates in our industry is high.

The results from preclinical studies or early clinical trials of a product candidate may not be predictive of the results from later preclinical studies or clinical trials, and interim results of a clinical trial are not necessarily indicative of final results. Product candidates in later stages of clinical trials may fail to show the desired safety and efficacy characteristics despite having progressed through preclinical studies and initial clinical trials. Many companies in the biopharmaceutical and biotechnology industries have suffered significant setbacks at later stages of development after achieving positive results in early stages of development, and we may face similar setbacks. These setbacks have been caused by, among other things, preclinical findings made while clinical trials were underway or safety or efficacy observations made in clinical trials, including previously unreported adverse events. Moreover, non-clinical and clinical data are often susceptible to varying interpretations and analyses, and many companies that believed their product candidates performed satisfactorily in preclinical studies and clinical trials nonetheless failed to obtain regulatory approval. With the exception of our allogeneic anti-CD19, anti-CD20 and anti-BCMA CAR T product candidates, which have undergone limited testing in humans to date, our gene editing technology and our product candidates have never undergone testing in humans and have only been tested in a limited manner in animals, and results from animal studies may not be predictive of clinical trial results. Even if product candidates progress to clinical trials, these product candidates may fail to show the safety and efficacy in clinical development required to obtain regulatory approval, despite the observation of positive results in animal studies. Our or our collaborators' failure to replicate positive results from early research programs and preclinical studies may prevent us from further developing and commercializing those or other product candidates, which would limit our potential to generate revenues from them and harm our business and prospects.

For the foregoing reasons, we cannot be certain that any ongoing or future preclinical studies or clinical trials will be successful. Any safety or efficacy concerns observed in any one of our preclinical studies or clinical trials in a targeted area could limit the prospects for regulatory approval of product candidates in that and other areas, which could have a material adverse effect on our business and prospects.

Interim, "top-line" and initial data from studies or trials that we announce or publish from time to time may change as more data become available and are subject to audit and verification procedures that could result in material changes in the final data.

From time to time, we may publish interim, initial or "top-line" data from preclinical studies or clinical trials, which is based on a preliminary analysis of then-available data, and the results and related findings and conclusions are subject to change following a more comprehensive review of the data related to the particular trial. We also make assumptions, estimations, calculations and conclusions as part of our analyses of data, and we may not have received or had the opportunity to fully and carefully evaluate all data. As a result, the top-line results that we report may differ from future results of the same studies, or different conclusions or considerations may qualify such results, once additional data have been received and fully evaluated. Initial or "top-line" data also remain subject to audit and verification procedures that may result in the final data being materially different from these initial data we previously published. As a result, interim, initial and "top-line" data should be viewed with caution until the final data are available.

Additionally, interim data from clinical trials that we may complete are subject to the risk that one or more of the clinical outcomes may materially change as patient enrollment continues and more patient data become available. Adverse differences between initial or interim data and final data could significantly harm our business prospects.

Further, others, including regulatory agencies, may not accept or agree with our assumptions, estimates, calculations, conclusions or analyses or may interpret or weigh the importance of data differently, which could impact the value of the particular program, the approvability or commercialization of the particular product candidate or product and our company in general. In addition, the information we choose to publicly disclose regarding a particular study or clinical trial is based on what is typically extensive information, and you or others may not agree with what we determine is the material or otherwise appropriate information to include in our disclosure. Any information we determine not to disclose may ultimately be deemed significant by you or others with respect to future decisions, conclusions, views, activities or otherwise regarding a particular product candidate or our business. If the top-line data that we report differ from actual results, or if others, including regulatory authorities, disagree with the conclusions reached, our ability to obtain approval for, and commercialize, product candidates may be harmed, which could significantly harm our business prospects.

Our product candidates may not work as intended or cause undesirable side effects that could hinder or prevent receipt of regulatory approval or realization of commercial potential for them or our other product candidates and substantially harm our business.

Our product candidates may be associated with off-target editing or other serious adverse events, undesirable side effects or unexpected characteristics, including large deletions and translocations or chromosomal abnormalities. Results of clinical trials could reveal severe or recurring side effects, toxicities or unexpected events, including death. Off-target cuts could lead to disruption of a gene or a genetic regulatory sequence at an unintended site in the DNA. In those instances where we also provide a segment of DNA, it is possible that following off-target cut events, such DNA could be integrated into the genome at an unintended site, potentially disrupting another important gene or genomic element. There may also be delayed adverse events following exposure to therapeutics made with genome editing technologies due to persistent biologic activity of the genetic material or other components of products used to carry the genetic material. Such unintended and undesirable side effects were recently exhibited in one of our competitors' clinical trials for which a clinical hold was placed by the FDA in October 2021 following a report of a chromosomal abnormality. In addition to serious adverse events or side effects caused by product candidates we develop alone or with collaborators, the administration process or related procedures may also cause undesirable side effects. For example, in our Phase 1/2a clinical trial of PBCAR0191, as of November 16, 2021, one death without disease progression occurred following infection and was assessed by the investigator as possibly related to study treatment. As of the same date, three other treatment emergent deaths without disease progression occurred that were deemed unrelated to study treatment.

Further, any side effects may not be appropriately recognized or managed by the treating medical staff. We or our collaborators expect to have to educate medical personnel using any product candidates we may develop to understand the side effect profiles for our clinical trials and upon any commercialization of such product candidates. Inadequate recognition or management of the potential side effects of such product candidates could result in patient injury or death.

If any such events occur, clinical trials or commercial distribution of any product candidates or products we develop alone or with collaborators could be suspended or terminated, and our business and reputation could suffer substantial harm. Treatment-related side effects could affect patient recruitment and the ability of enrolled patients to complete the trial or result in potential liability claims. Regulatory authorities could order us or our collaborators to cease further development of, deny approval of or require us to cease selling any product candidates or products for any or all targeted indications. If we or our collaborators elect, or are required, to delay, suspend or terminate any clinical trial or commercialization efforts, the commercial prospects of such product candidates or products may be harmed, and our ability to generate product revenues from them or other product candidates that we develop may be delayed or eliminated.

Additionally, if we successfully develop a product candidate alone or with collaborators and it receives marketing approval, the FDA or foreign regulatory authorities could require us to adopt a REMS or similar risk management measures to ensure that the benefits of treatment with such product candidate outweigh the risks for each potential patient, which may include, among other things, a communication plan to health care practitioners, patient education, extensive patient monitoring or distribution systems and processes that are highly controlled, restrictive and more costly than what is typical for the industry. We or our collaborators may also be required to adopt a REMS or similar risk management measures or engage in similar actions, such as patient education, certification of health care professionals or specific monitoring, if we or others later identify undesirable side effects caused by any product that we develop alone or with collaborators. Such identification could also have several additional significant negative consequences, such as:

- regulatory authorities may suspend, withdraw or limit approvals of such product, or seek an injunction against its manufacture or distribution;
- regulatory authorities may require additional warnings on the label, including "boxed" warnings, or issue safety alerts, Dear Healthcare Provider letters, press releases or other communications containing warnings or other safety information about the product;
- we may be required to create a medication guide outlining the risks of such side effects for distribution to patients;
- we may be required to change the way a product is administered or conduct additional trials;
- the product may become less competitive;
- we or our collaborators may decide to remove the product from the marketplace;
- we may be subject to fines, injunctions or the imposition of civil or criminal penalties;
- we could be sued and be held liable for harm caused to patients; and
- our reputation may suffer.

Any of these events could prevent us or our collaborators from achieving or maintaining market acceptance of any potential product, or otherwise have a negative impact on our business.

We are subject to federal, state and foreign healthcare laws and regulations relating to our business, and could face substantial penalties if we are determined not to have fully complied with such laws, which would have an adverse impact on our business.

Our business operations, as well as our current and anticipated future arrangements with investigators, healthcare professionals, consultants, third-party payors, customers and patients, expose or will expose us to broadly applicable foreign, federal, and state fraud and abuse and other healthcare laws and regulations. These laws constrain the business or financial arrangements and relationships through which we conduct our operations, including how we research, market, sell and distribute any potential products for which we may obtain marketing approval. Such laws include:

- the U.S. federal Anti-Kickback Statute, which prohibits, among other things, persons and entities from knowingly and willfully soliciting, offering, receiving or providing remuneration, directly or indirectly, in cash or in kind, to induce or reward, or in return for, either the referral of an individual for, or the purchase, order or recommendation of, any good or service, for which payment may be made under a U.S. healthcare program such as Medicare and Medicaid. A person or entity does not need to have actual knowledge of the U.S. federal Anti-Kickback Statute or specific intent to violate it in order to have committed a violation;

- U.S. federal civil and criminal false claims laws, including the civil False Claims Act, which can be enforced through civil whistleblower or qui tam actions, and civil monetary penalties laws, prohibits, among other things, individuals and entities from knowingly presenting, or causing to be presented, to the U.S. government, claims for payment or approval that are false or fraudulent, knowingly making, using or causing to be made or used, a false record or statement material to a false or fraudulent claim, or from knowingly making a false statement to avoid, decrease or conceal an obligation to pay money to the U.S. government. In addition, the government may assert that a claim including items or services resulting from a violation of the U.S. federal Anti-Kickback Statute constitutes a false or fraudulent claim for purposes of the civil False Claims Act;

- the U.S. Health Insurance Portability and Accountability Act of 1996 (“HIPAA”), which imposes criminal and civil liability for, among other things, knowingly and willfully executing, or attempting to execute, a scheme to defraud any healthcare benefit program, including private third-party payors, or knowingly and willfully falsifying, concealing or covering up a material fact or making any materially false statement, in connection with the delivery of, or payment for, healthcare benefits, items or services. Similar to the U.S. federal Anti-Kickback Statute, a person or entity does not need to have actual knowledge of the statute or specific intent to violate it in order to have committed a violation;

- the U.S. Physician Payments Sunshine Act, which requires certain manufacturers of drugs, devices, biologics and medical supplies for which payment is available under Medicare, Medicaid or the Children’s Health Insurance Program (with certain exceptions) to report annually to CMS information related to payments or other “transfers of value” made to physicians (defined to include doctors, dentists, optometrists, podiatrists and chiropractors), certain non-physician practitioners such as physician assistants and nurse practitioners, and teaching hospitals, and requires applicable manufacturers and group purchasing organizations to report annually to the Centers for Medicare and Medicaid Services (“CMS”), ownership and investment interests held by the physicians described above and their immediate family members; and

- analogous state and foreign laws and regulations, such as state anti-kickback and anti-corruption and false claims laws, which may apply to our business practices, including, but not limited to, research, distribution, sales and marketing arrangements and claims involving healthcare items or services reimbursed by non-governmental third-party payors, including private insurers, or by the patients themselves; state laws and foreign laws and regulations that require pharmaceutical and device companies to comply with the industry’s voluntary compliance guidelines and the relevant compliance guidance promulgated by the U.S. government or foreign governmental authorities, or otherwise restrict payments that may be made to healthcare providers and other potential referral sources; state and local laws and regulations and foreign. laws and regulations that require manufacturers to report information related to payments and other transfers of value to physicians and other healthcare providers or marketing expenditures and pricing information; state and local laws and foreign laws and regulations which require the registration of pharmaceutical sales representatives.

Efforts to ensure that our current and future business arrangements with third parties will comply with applicable healthcare laws and regulations will involve substantial costs. It is possible that governmental authorities may conclude that our business practices, including our relationships with certain physicians, some of whom are compensated in the form of stock options for consulting services provided, do not comply with current or future statutes, regulations, agency guidance or case law involving applicable healthcare laws. If our operations are found to be in violation of any of these or any other health regulatory laws that may apply to us, we may be subject to significant penalties, including the imposition of significant civil, criminal and administrative penalties, damages, monetary fines, disgorgement, individual imprisonment, possible exclusion from participation in Medicare, Medicaid and other U.S. or foreign healthcare programs, additional reporting requirements and oversight if we become subject to a corporate integrity agreement or similar agreement to resolve allegations of non-compliance with these laws, contractual damages, reputational

harm, diminished profits and future earnings, and curtailment or restructuring of our operations, any of which could adversely affect our ability to operate our business and our results of operations. Defending against any such actions can be costly, time-consuming and may require significant financial and personnel resources. Therefore, even if we are successful in defending against any such actions that may be brought against us, our business may be impaired. If any of the above occur, it could adversely affect our ability to operate our business and our results of operations.

Actual or perceived failures to comply with applicable data protection, privacy and security laws, regulations, standards and other requirements, and the increasing use of social media, could adversely affect our business, results of operations, and financial condition.

The global data protection landscape is rapidly evolving, and we are or may become subject to numerous state, federal and foreign laws, requirements and regulations governing the collection, use, disclosure, retention, and security of personal data, such as information that we may collect in connection with clinical trials in the U.S. and abroad. Implementation standards and enforcement practices are likely to remain uncertain for the foreseeable future, and we cannot yet determine the impact future laws, regulations, standards, or perception of their requirements may have on our business. This evolution may create uncertainty in our business, affect our ability to operate in certain jurisdictions or to collect, store, transfer use and share personal information, necessitate the acceptance of more onerous obligations in our contracts, result in liability or impose additional costs on us. The cost of compliance with these laws, regulations and standards can be high and is likely to increase in the future. Any failure or perceived failure by us to comply with federal, state or foreign laws or regulation, our internal policies and procedures or our contracts governing our processing of personal information could result in negative publicity, government investigations and enforcement actions, claims by third parties and damage to our reputation, any of which could have a material adverse effect on our operations, financial performance and business.

As our operations and business grow, we may become subject to or affected by new or additional data protection laws and regulations and face increased scrutiny or attention from regulatory authorities. In the U.S., HIPAA, as amended by the Health Information Technology for Economic and Clinical Health Act of 2009 and their implementing regulations, imposes, among other things, certain standards relating to the privacy, security, transmission and breach reporting of individually identifiable health information on covered entities (defined as health plans, health care clearinghouses and certain health care providers) and their respective business associates, individuals or entities that create, receive, maintain or transmit protected health information in connection with providing a service for or on behalf of a covered entity. HIPAA mandates the reporting of certain breaches of health information to HHS, affected individuals and if the breach is large enough, the media. Entities that are found to be in violation of HIPAA as the result of a breach of unsecured protected health information, a complaint about privacy practices or an audit by HHS, may be subject to significant civil, criminal and administrative fines and penalties and/or additional reporting and oversight obligations if required to enter into a resolution agreement and corrective action plan with HHS to settle allegations of HIPAA non-compliance. Even when HIPAA does not apply, according to the Federal Trade Commission or the FTC, failing to take appropriate steps to keep consumers' personal information secure constitutes unfair acts or practices in or affecting commerce in violation of Section 5(a) of the Federal Trade Commission Act. The FTC expects a company's data security measures to be reasonable and appropriate in light of the sensitivity and volume of consumer information it holds, the size and complexity of its business, and the cost of available tools to improve security and reduce vulnerabilities. Individually identifiable health information is considered sensitive data that merits stronger safeguards.

Certain states have also adopted comparable privacy and security laws and regulations, some of which may be more stringent than HIPAA. Such laws and regulations will be subject to interpretation by various courts and other governmental authorities, thus creating potentially complex compliance issues for us and our future customers and strategic partners. For example, California recently enacted the CCPA, which went into effect on January 1, 2020. The CCPA creates individual privacy rights for California consumers and increases the privacy and security obligations of entities handling certain personal information. The CCPA provides for civil penalties for violations, as well as a private right of action for data breaches that is expected to increase data breach litigation. Further, the CPRA, recently passed in California. The CPRA significantly amends the CCPA and will impose additional data protection obligations on covered businesses, including additional consumer rights processes, limitations on data uses, new audit requirements for higher risk data, and opt outs for certain uses of sensitive data. It will also create a new California data protection agency authorized to issue substantive regulations and could result in increased privacy and information security enforcement. The majority of the CPRA provisions are expected to go into effect on January 1, 2023. The CCPA, and the CPRA, may increase our compliance costs and potential liability, and many similar laws have been proposed at the federal level and in other states. In the event that we are subject to or affected by HIPAA, the CCPA, the CPRA or other domestic privacy and data protection laws, any liability from failure to comply with the requirements of these laws could adversely affect our financial condition.

In Europe, the GDPR went into effect in May 2018 and imposes strict requirements for processing the personal data of individuals within the EEA. Companies that must comply with the GDPR face increased compliance obligations and risk, including more robust regulatory enforcement of data protection requirements. From January 1, 2021 we are subject to compliance with the GDPR and the UK GDPR, which, together with the amended UK Data Protection Act 2018, retains the GDPR in UK national law. The UK GDPR mirrors the fines under the GDPR, i.e., fines up to the greater of €20 million/ £17 million or 4% of global turnover. The relationship between the UK and the EU in relation to certain aspects of data protection law remains unclear, and it is unclear how UK data protection laws and regulations will develop in the medium to longer term. The European Commission has adopted an adequacy decision in favor of the UK, enabling data transfers from EU member states to the UK without additional safeguards. However, the UK adequacy decision will automatically expire in June 2025 unless the European Commission re-assesses and renews or extends that decision.

Recent legal developments in Europe have created complexity and uncertainty regarding transfers of personal data from the EEA and the UK to the U.S. Most recently, on July 16, 2020, the Court of Justice of the European Union ("CJEU") invalidated the EU-US Privacy Shield Framework, the Privacy Shield, under which personal data could be transferred from the EEA to US entities who had self-certified under the Privacy Shield scheme. While the CJEU upheld the adequacy of the standard contractual clauses ("SCCs"), it made clear that reliance on them alone may not necessarily be sufficient in all circumstances. Use of the SCCs must now be assessed on a case-by-case basis taking into account the legal regime applicable in the destination country, in particular applicable surveillance laws and rights of individuals and additional measures and/or contractual provisions may need to be put in place, however, the nature of these additional measures is currently uncertain. The CJEU went on to state that if a competent supervisory authority believes that the standard contractual clauses cannot be complied with in the destination country and the required level of protection cannot be secured by other means, such supervisory authority is under an obligation to suspend or prohibit that transfer. The European Commission issued revised SCCs on June 4, 2021 to account for the decision of the CJEU and recommendations made by the European Data Protection Board. The revised SCCs must be used for relevant new data transfers from September 27, 2021; existing standard contractual clauses arrangements must be migrated to the revised clauses by December 27, 2022. The new SCCs apply only to the transfer of personal data outside of the EEA and not the UK; the UK's Information Commissioner's Office launched a public consultation on its draft revised data transfers mechanisms in August 2021. There is some uncertainty around whether the revised clauses can be used for all types of data transfers, particularly whether they can be relied on for data transfers to non-EEA entities subject to the GDPR.

These recent developments may require us to review and amend the legal mechanisms by which we make and/ or receive personal data transfers to/ in the U.S. As supervisory authorities issue further guidance on personal data export mechanisms, including circumstances where the standard contractual clauses cannot be used, and/or start taking enforcement action, we could suffer additional costs, complaints and/or regulatory investigations or fines, and/or if we are otherwise unable to transfer personal data between and among countries and regions in which we operate, it could affect the manner in which we provide our services, the geographical location or segregation of our relevant systems and operations, and could adversely affect our financial results.

Despite our efforts to monitor evolving social media communication guidelines and comply with applicable rules, there is risk that the use of social media by us or our employees to communicate about our product candidates or business may cause us to be found in violation of applicable requirements. In addition, our employees may knowingly or inadvertently make use of social media in ways that may not comply with our internal policies or other legal or contractual requirements, which may give rise to liability, lead to the loss of trade secrets or other intellectual property, or result in public exposure of personal information of our employees, clinical trial patients, customers and others. Our potential patient population may also be active on social media and use these platforms to comment on the effectiveness of, or adverse experiences with, our product candidates. Negative posts or comments about us or our product candidates on social media could seriously damage our reputation, brand image and goodwill.

Although we work to comply with applicable laws, regulations and standards, our contractual obligations and other legal obligations, these requirements are evolving and may be modified, interpreted and applied in an inconsistent manner from one jurisdiction to another, and may conflict with one another or other legal obligations with which we must comply. Any failure or perceived failure by us or our employees, representatives, contractors, consultants, CROs, collaborators, or other third parties to comply with such requirements or adequately address privacy and security concerns, even if unfounded, could result in additional cost and liability to us, damage our reputation, and adversely affect our business and results of operations.

We have received orphan drug designation for PBCAR0191 for the treatment of ALL and MCL and for PBCAR269A for the treatment of multiple myeloma, and we may seek orphan drug designation for some or all of our other product candidates, but we may be unable to obtain such designations or to maintain the benefits associated with orphan drug designation, which may negatively impact our ability to develop or obtain regulatory approval for such product candidates and may reduce our revenue if we obtain such approval.

We may seek orphan drug designation for some or all of our product candidates in specific orphan indications in which there is a medically plausible basis for the use of these products. Under the Orphan Drug Act, the FDA may grant orphan designation to a drug

or biologic intended to treat a rare disease or condition, defined as a disease or condition with a patient population of fewer than 200,000 in the United States, or a patient population greater than 200,000 in the United States when there is no reasonable expectation that the cost of developing and making available the drug or biologic in the United States will be recovered from sales in the United States for that drug or biologic. Orphan drug designation must be requested before submitting a BLA. In the United States, orphan drug designation entitles a party to financial incentives such as opportunities for grant funding towards clinical trial costs, tax advantages and user-fee waivers. After the FDA grants orphan drug designation, the generic identity of the drug and its potential orphan use are disclosed publicly by the FDA. Orphan drug designation does not convey any advantage in, or shorten the duration of, the regulatory review and approval process. Although we may seek orphan product designation for some or all of our other product candidates, we may never receive such designations.

If a product that has orphan drug designation subsequently receives the first FDA approval for a particular active ingredient for the disease for which it has such designation, the product is entitled to orphan product exclusivity, which means that the FDA may not approve any other applications, including a BLA, to market the same biologic for the same indication for seven years, except in limited circumstances such as a showing of clinical superiority to the product with orphan product exclusivity or if FDA finds that the holder of the orphan drug exclusivity has not shown that it can ensure the availability of sufficient quantities of the orphan drug to meet the needs of patients with the disease or condition for which the drug was designated. Even if we or our collaborators obtain orphan drug designation for a product candidate, we may not be the first to obtain marketing approval for any particular orphan indication due to the uncertainties associated with developing pharmaceutical products. Exclusive marketing rights in the United States may be limited if we or our collaborators seek approval for an indication broader than the orphan designated indication and may be lost if the FDA later determines that the request for designation was materially defective or if the manufacturer is unable to assure sufficient quantities of the product to meet the needs of patients with the rare disease or condition. Further, even if a product obtains orphan drug exclusivity, that exclusivity may not effectively protect the product from competition because different drugs with different active moieties can be approved for the same condition. Even after an orphan drug is approved, the FDA can subsequently approve the same drug with the same active moiety for the same condition if the FDA concludes that the later drug is safer, more effective, or makes a major contribution to patient care. Furthermore, the FDA can waive orphan exclusivity if we or our collaborators are unable to manufacture sufficient supply of the product.

Similarly, in the EU, a medicinal product may receive orphan designation under Article 3 of Regulation (EC) 141/2000. This applies to products (1) that are intended for a life-threatening or chronically debilitating condition; and (2) either (a) such condition affects not more than five in 10,000 persons in the EU when the application is made, or (b) the product, without the benefits derived from orphan status, would be unlikely to generate sufficient returns in the EU to justify the necessary investment, and (3) there exists no satisfactory method of diagnosis, prevention or treatment of such condition authorized for marketing in the EU or, if such a method exists, the product will be of significant benefit to those affected by the condition. In the EU, orphan medicinal products are eligible for financial incentives such as reduction of fees or fee waivers and applicants can benefit from specific regulatory assistance and scientific advice. Upon grant of a MA, orphan medicinal products are entitled to 10 years of market exclusivity, during which time no similar medicinal product for the same indication may be placed on the market. An orphan product can also obtain an additional two years of market exclusivity in the EU for pediatric studies. However, the 10-year market exclusivity may be reduced to six years if, at the end of the fifth year, it is established that the product no longer meets the criteria for orphan designation—for example, if the product is sufficiently profitable not to justify maintenance of market exclusivity. Additionally, marketing authorization may be granted to a similar product for the same indication at any time if:

- the second applicant can establish that its product, although similar, is safer, more effective or otherwise clinically superior;
- the first applicant consents to a second orphan medicinal product application; or
- the first applicant cannot supply enough orphan medicinal product.

If we or our collaborators do not receive or maintain orphan drug designation for product candidates for which we seek such designation, it could limit our ability to realize revenues from such product candidates.

We have received and may continue to seek fast track designation and rare pediatric disease designation, and may seek breakthrough therapy designation, Regenerative Medicine Advanced Therapy ("RMAT") designation, or priority review from the FDA or access to the PRIME scheme from the EMA for some or all of our product candidates, but we may not receive such designations, and even if we do, it may not lead to a faster development or regulatory review or approval process, and will not increase the likelihood that such product candidates will receive marketing approval.

We have received fast track designation and rare pediatric disease designation for PBCAR0191 for the treatment of B-ALL as well as fast track designation for PBCAR269A for R/R multiple myeloma. We may continue to seek fast track designation and may also seek breakthrough therapy designation, RMAT designation or priority review from the FDA, or access to the PRIME scheme from the EMA for some or all of our product candidates. If a drug, or biologic, in our case, is intended for the treatment of a serious or life-threatening condition or disease, and nonclinical or clinical data demonstrate the potential to address an unmet medical need, the

product may qualify for FDA fast track designation, for which sponsors must apply. The FDA has broad discretion whether or not to grant this designation. If granted, fast track designation makes a biologic eligible for more frequent interactions with FDA to discuss the development plan and clinical trial design, as well as rolling review of the application, which means that the company can submit completed sections of its marketing application for review prior to completion of the entire submission. Products with fast track designation may also be eligible for accelerated approval and/or priority review, if the relevant criteria are met.

Breakthrough therapy designation is intended to expedite the development and review of product candidates that treat serious or life-threatening diseases when "preliminary clinical evidence indicates that the drug may demonstrate substantial improvement over existing therapies on one or more clinically significant endpoints, such as substantial treatment effects observed early in clinical development." The designation of a product candidate as a breakthrough therapy provides the same potential benefits as a fast track designation, with more intensive FDA guidance on an efficient development program and an organizational commitment at FDA involving senior managers.

A company may also request RMAT designation of its product candidate, which designation may be granted if the drug meets the following criteria: (1) it qualifies as a RMAT, which is defined as a cell therapy, therapeutic tissue engineering product, human cell and tissue product, or any combination product using such therapies or products, with limited exceptions; (2) it is intended to treat, modify, reverse, or cure a serious or life-threatening disease or condition; and (3) preliminary clinical evidence indicates that the drug has the potential to address unmet medical needs for such a disease or condition. Like breakthrough therapy designation, RMAT designation provides potential benefits that include more frequent meetings with FDA to discuss the development plan for the product candidate, and potential eligibility for rolling review and priority review. Products granted RMAT designation may also be eligible for accelerated approval on the basis of a surrogate or intermediate endpoint reasonably likely to predict long-term clinical benefit, or reliance upon data obtained from a meaningful number of sites, including through expansion to additional sites. RMAT- designated products that receive accelerated approval may, as appropriate, fulfill their post-approval requirements through the submission of clinical evidence, clinical studies, patient registries, or other sources of real world evidence (such as electronic health records); through the collection of larger confirmatory data sets; or via post-approval monitoring of all patients treated with such therapy prior to approval of the therapy.

PRIME is a scheme provided by the EMA to enhance support for the development of medicines that target an unmet medical need. To qualify for PRIME, product candidates require early clinical evidence that the therapy has the potential to offer a therapeutic advantage over existing treatments or benefits patients without treatment options. Among the benefits of PRIME are the appointment of a rapporteur to provide continuous support and help build knowledge ahead of a marketing authorization application, early dialogue and scientific advice at key development milestones, and the potential to qualify products for accelerated review earlier in the application process.

Based on legislation adopted late in 2007, the EMA established an additional regulatory designation for products classified as an ATMP. The ATMP classification offers sponsors a variety of benefits similar to those associated with the PRIME scheme, including scientific and regulatory guidance, additional opportunities for dialogue with regulators, and presubmission review and certification of the CMC and nonclinical data proposed for submission in a forthcoming MA applications for micro-, small-, or medium-sized enterprises. To qualify for this designation, product candidates intended for human use must be based on gene therapy, somatic cell therapy, or tissue engineered therapy (i.e., engineered cells or tissues intended to regenerate, replace or repair human tissue).

There is no assurance that we will obtain additional fast track designation, or that we will obtain breakthrough therapy designation, RMAT designation or access to PRIME or ATMP for any of our product candidates. Fast track designation, breakthrough therapy designation, RMAT designation, and PRIME and ATMP eligibility do not change the standards for product approval, and there is no assurance that any such designation or eligibility will result in expedited review or approval or that the approved indication will not be narrower than the indication covered by the fast track designation, breakthrough therapy designation, RMAT designation or PRIME or ATMP eligibility. Additionally, fast track designation, breakthrough therapy designation, RMAT designation and access to PRIME or ATMP can each be revoked if the criteria for eligibility cease to be met as clinical data emerges.

If the product candidates that we or our collaborators may develop receive regulatory approval in the United States or another jurisdiction, they may never receive approval in other jurisdictions, which would limit market opportunities for such product candidate and adversely affect our business.

Approval of a product candidate in the United States by the FDA or by the requisite regulatory agencies in any other jurisdiction does not ensure approval of such product candidate by regulatory authorities in other countries or jurisdictions. The approval process varies among countries and may limit our or our collaborators' ability to develop, manufacture, promote and sell product candidates internationally. Failure to obtain marketing approval in international jurisdictions would prevent the product candidates from being marketed outside of the jurisdictions in which regulatory approvals have been received. In order to market and sell product candidates in the EU and many other jurisdictions, we and our collaborators must obtain separate marketing approvals and comply with numerous and varying regulatory requirements. The approval procedure varies among countries and may involve additional preclinical studies or clinical trials both before and after approval. In many countries, any product candidate for human use must be approved for

reimbursement before it can be approved for sale in that country. In some cases, the intended price for such product is also subject to approval. Further, while regulatory approval of a product candidate in one country does not ensure approval in any other country, a failure or delay in obtaining regulatory approval in one country may have a negative effect on the regulatory approval process in others. If we or our collaborators fail to comply with the regulatory requirements in international markets or to obtain all required marketing approvals, the target market for a particular potential product will be reduced, which would limit our ability to realize the full market potential for the product and adversely affect our business.

Current and future legislation may increase the difficulty and cost for us to obtain marketing approval of and commercialize any product candidates we or our collaborators develop and may adversely affect the prices for such product candidates.

In the United States and certain foreign jurisdictions, there have been, and we expect there will continue to be, a number of legislative and regulatory changes and proposed changes regarding the healthcare system that could, among other things, prevent or delay marketing approval of our product candidates, restrict or regulate post-approval activities and affect our or our collaborators' ability to profitably sell any product candidates that obtain marketing approval.

For example, in March 2010, the Patient Protection and Affordable Care Act, as amended by the Health Care and Education Reconciliation Act, collectively the ACA, was enacted in the United States. Among the provisions of the Affordable Care Act of importance to our product candidates, the ACA established an annual, nondeductible fee on any entity that manufactures or imports specified branded prescription drugs and biologic agents; increased the statutory minimum rebates a manufacturer must pay under the Medicaid Drug Rebate Program, extended manufacturers' Medicaid rebate liability to covered drugs dispensed to individuals who are enrolled in Medicaid managed care organizations, expanded eligibility criteria for Medicaid programs, expanded the entities eligible for discounts under the Public Health program, addressed a new methodology by which rebates owed by manufacturers under the Medicaid Drug Rebate Program are calculated for drugs that are inhaled, infused, instilled, implanted or injected, created a new Medicare Part D coverage gap discount program, in which manufacturers must now agree to offer 70% point-of-sale discounts off negotiated prices of applicable brand drugs to eligible beneficiaries during their coverage gap period, as a condition for the manufacturer's outpatient drugs to be covered under Medicare Part D, and created a licensure framework for follow-on biologic products.

Since its enactment, there have been judicial, administrative, executive, and legislative challenges to certain aspects of the ACA, and the most recent judicial challenge to the ACA brought before the Supreme Court was dismissed in June 2021 resulting in the ACA remaining in effect in its current form. Prior to the Supreme Court's decision. President Biden issued an executive order instructing certain governmental agencies to review and reconsider their existing policies and rules that limit access to healthcare, including among others, reexamining Medicaid demonstration projects and waiver programs that include work requirements, and policies that create unnecessary barriers to obtaining access to health insurance coverage through Medicaid or the ACA. It is unclear how other health reform measures of the Biden administration will impact our business.

In addition, other legislative changes have been proposed and adopted since the ACA was enacted. On August 2, 2011, the Budget Control Act of 2011 was signed into law, which, among other things, included reductions to Medicare payments to providers of 2% per fiscal year, which went into effect on April 1, 2013 and, due to subsequent legislative amendments to the statute, will remain in effect through 2030, with the exception of a temporary suspension from May 1, 2020 through March 31, 2022, unless additional Congressional action is taken. On January 2, 2013, the American Taxpayer Relief Act of 2012 was signed into law, which, among other things, reduced Medicare payments to several providers, including hospitals, and increased the statute of limitations period for the government to recover overpayments to providers from three to five years.

Further, there has been heightened governmental scrutiny recently over pharmaceutical pricing practices in light of the rising cost of prescription drugs and biologics. Such scrutiny has resulted in several Congressional inquiries and proposed and enacted federal and state legislation designed to, among other things, bring more transparency to product pricing, review the relationship between pricing and manufacturer patient programs, and reform government program reimbursement methodologies, rebates and price negotiation for pharmaceutical products. At the state level, legislatures have increasingly passed legislation and implemented regulations designed to control pharmaceutical product and medical device pricing, including price or patient reimbursement constraints, discounts, restrictions on certain product access and marketing cost disclosure and transparency measures, and, in some cases, designed to encourage importation from other countries and bulk purchasing. In addition, regional healthcare authorities and individual hospitals are increasingly using bidding procedures to determine what pharmaceutical products and medical devices to purchase and which suppliers will be included in their prescription drug and other healthcare programs.

We expect that other healthcare reform measures that may be adopted in the future, may result in more rigorous coverage criteria, new payment methodologies and in additional downward pressure on the price that we or our collaborators may receive for any approved or cleared product. Any reduction in reimbursement from Medicare or other government programs may result in a similar reduction in payments from private payors. We cannot predict the likelihood, nature or extent of government regulation that may arise from future legislation or administrative action, either in the United States or abroad. If we or our collaborators are slow or unable to adapt to new

requirements or policies, or if we or our collaborators are not able to maintain regulatory compliance, any of our product candidates may lose any regulatory approval that may have been obtained and we may not achieve or sustain profitability, which would adversely affect our business.

Even if we obtain regulatory approval for any products that we develop alone or with collaborators, such products will remain subject to ongoing regulatory requirements, which may result in significant additional expense.

Even if products we develop alone or with collaborators receive regulatory approval, they will be subject to ongoing regulatory requirements for manufacturing, labeling, packaging, distribution, storage, advertising, promotion, sampling, record-keeping and submission of safety and other post-market information, among other things. Any regulatory approvals received for such products may also be subject to limitations on the approved indicated uses for which they may be marketed or to the conditions of approval, or contain requirements for potentially costly post-marketing testing and surveillance studies. For example, the holder of an approved BLA in the United States is obligated to monitor and report adverse events and any failure of a product to meet the specifications in the BLA. FDA guidance advises that patients treated with some types of gene therapy undergo follow-up observations for potential adverse events for as long as 15 years. Similarly, in the EU, pharmacovigilance obligations are applicable to all medicinal products. In addition to those, holders of a marketing authorization for gene or cell therapy products must detail, in their application, the measures they envisage to ensure follow-up of the efficacy and safety of these products. In cases of particular concern, marketing authorization holders for gene or cell therapy products in the EU may be required to design a risk management system with a view to identifying, preventing or minimizing risks and may be obliged to carry out post-marketing studies. In the United States, the holder of an approved BLA must also submit new or supplemental applications and obtain FDA approval for certain changes to the approved product, product labeling or manufacturing process. Similar provisions apply in the EU. Advertising and promotional materials must comply with FDA rules and are subject to FDA review, in addition to other potentially applicable federal and state laws. Similarly, in the EU any promotion of medicinal products is highly regulated and, depending on the specific jurisdiction involved, may require prior vetting by the competent national regulatory authority.

In addition, product manufacturers and their facilities are subject to payment of user fees and continual review and periodic inspections by the FDA and other regulatory authorities for compliance with GMP requirements and adherence to commitments made in the BLA or foreign marketing application. If we, our collaborators or a regulatory agency discovers previously unknown problems with a product such as adverse events of unanticipated severity or frequency or problems with the facility where the product is manufactured or disagrees with the promotion, marketing or labeling of that product, a regulatory agency may impose restrictions relative to that product, the manufacturing facility or us or our collaborators, including requiring recall or withdrawal of the product from the market or suspension of manufacturing.

Moreover, if any of our product candidates are approved, our product labeling, advertising, promotion and distribution will be subject to regulatory requirements and continuing regulatory review. The FDA and foreign regulatory authorities strictly regulate the promotional claims that may be made about drug products. In particular, a product may not be promoted for uses that are not approved by the FDA and foreign regulatory authorities as reflected in the product's approved labeling.

If we or our collaborators fail to comply with applicable regulatory requirements following approval of any potential products we may develop, authorities may:

- issue an untitled enforcement letter or a warning letter asserting a violation of the law;
- seek an injunction, impose civil and criminal penalties, and impose monetary fines, restitution or disgorgement of profits or revenues;
- suspend or withdraw regulatory approval;
- suspend or terminate any ongoing clinical trials or implement requirements to conduct post-marketing studies or clinical trials;
- refuse to approve a pending BLA or comparable foreign marketing application (or any supplements thereto) submitted by us or our collaborators;
- restrict the labeling, marketing, distribution, use or manufacturing of products;
- seize or detain products or otherwise require the withdrawal or recall of products from the market;
- refuse to approve pending applications or supplements to approved applications that we or our collaborators submit;
- refuse to permit the import or export of products; or
- refuse to allow us or our collaborators to enter into government contracts.

Any government investigation of alleged violations of law could require us to expend significant time and resources in response and could generate negative publicity. The occurrence of any event or penalty described above may inhibit our or our collaborators' ability to commercialize products and our ability to generate revenues.

In addition, the FDA's policies, and policies of foreign regulatory agencies, may change, and additional regulations may be enacted that could prevent, limit or delay regulatory approval of product candidates. We cannot predict the likelihood, nature or extent of government regulation that may arise from future legislation or administrative or executive action, either in the United States or abroad. If we or our collaborators are slow or unable to adapt to changes in existing requirements or the adoption of new requirements, or if we or our collaborators are unable to maintain regulatory compliance, we or they may be subject to enforcement action and we may not achieve or sustain profitability.

The FDA and other regulatory agencies actively enforce the laws and regulations prohibiting the promotion of off-label uses. If we are found or alleged to have improperly promoted off-label uses, we may become subject to significant liability.

The FDA and other regulatory agencies strictly regulate the promotional claims that may be made about prescription products, as our product candidates would be, if approved. In particular, a product may not be promoted for uses that are not approved by the FDA or such other regulatory agencies as reflected in the product's approved labeling. If we are found to have promoted such off-label uses, we may become subject to significant liability. The federal government has levied large civil and criminal fines against companies for alleged improper promotion and has enjoined several companies from engaging in off-label promotion. The FDA has also requested that companies enter into consent decrees or permanent injunctions under which specified promotional conduct is changed or curtailed. If we cannot successfully manage the promotion and avoid off-label promotion of our product candidates, if approved, we could become subject to significant liability, which would materially adversely affect our business and financial condition.

Disruptions at the FDA and other government agencies caused by funding shortages or global health concerns could hinder their ability to hire, retain or deploy key leadership and other personnel, or otherwise prevent new or modified products from being developed, approved or commercialized in a timely manner or at all, which could negatively impact our business.

The ability of the FDA and foreign regulatory authorities to review and approve new products can be affected by a variety of factors, including government budget and funding levels, statutory, regulatory and policy changes, the FDA's or foreign regulatory authorities' ability to hire and retain key personnel and accept the payment of user fees, and other events that may otherwise affect the FDA's or foreign regulatory authorities' ability to perform routine functions. Average review times at the FDA and foreign regulatory authorities have fluctuated in recent years as a result. In addition, government funding of other government agencies that fund research and development activities is subject to the political process, which is inherently fluid and unpredictable. Disruptions at the FDA and other agencies, such as the EMA following its relocation to Amsterdam and resulting staff changes, may also slow the time necessary for new biologics or modifications to approved biologics to be reviewed and/or approved by necessary government agencies, which would adversely affect our business. For example, over the last several years, the U.S. government has shut down several times and certain regulatory agencies, such as the FDA, have had to furlough critical FDA employees and stop critical activities.

Separately, in response to the COVID-19 pandemic, in March 2020, the FDA announced its intention to postpone most inspections of foreign manufacturing facilities, and on March 18, 2020, the FDA temporarily postponed routine surveillance inspections of domestic manufacturing facilities. Subsequently, in July 2020, the FDA resumed certain on-site inspections of domestic manufacturing facilities subject to a risk-based prioritization system. The FDA utilized this risk-based assessment system to assist in determining when and where it was safest to conduct prioritized domestic inspections. Additionally, on April 15, 2021, the FDA issued a guidance document in which the FDA described its plans to conduct voluntary remote interactive evaluations of certain drug manufacturing facilities and clinical research sites, among other facilities. According to the guidance, the FDA may request such remote interactive evaluations where the FDA determines that remote evaluation would be appropriate based on mission needs and travel limitations. In May 2021, the FDA outlined a detailed plan to move toward a more consistent state of inspectional operations, and in July 2021, the FDA resumed standard inspectional operations of domestic facilities. More recently, the FDA has continued to monitor and implement changes to its inspectional activities to ensure the safety of its employees and those of the firms it regulates as it adapts to the evolving COVID-19 pandemic. Regulatory authorities outside the United States have adopted similar restrictions or other policy measures in response to the COVID-19 pandemic and its variants. If a prolonged government shutdown occurs, or if global health concerns continue to prevent the FDA or other regulatory authorities from conducting their regular inspections, reviews or other regulatory activities, it could significantly impact the ability of the FDA or other regulatory authorities to timely review and process our regulatory submissions, which could have a material adverse effect on our business.

Even if any product we develop alone or with collaborators receives marketing approval, such product may fail to achieve the degree of market acceptance by physicians, patients, healthcare payors and others in the medical community necessary for commercial success.

The commercial success of any potential therapeutic products we develop alone or with collaborators will depend upon their degree of market acceptance by physicians, patients, third-party payors and others in the medical community. Even if any potential therapeutic products we develop alone or with collaborators receive marketing approval, they may nonetheless fail to gain sufficient market acceptance by physicians, patients, healthcare payors and others in the medical community. The degree of market acceptance of any product we develop alone or with collaborators, if approved for commercial sale, will depend on a number of factors, including:

- the efficacy and safety of such product as demonstrated in clinical trials;
- the prevalence and severity of any side effects;
- the clinical indications for which the product is approved by FDA or other regulatory authorities;
- product labeling or product insert requirements of the FDA or other regulatory authorities, including any limitations or warnings contained in a product's approved labeling;
- public attitudes regarding genome editing technologies;
- our and any collaborators' ability to educate the medical community about the safety and effectiveness of the product;
- the willingness of the target patient population to try new therapies and of physicians to prescribe these therapies, as well as their willingness to accept a therapeutic intervention that involves the editing of the patient's genome;
- the potential and perceived advantages compared to alternative treatments;
- convenience and ease of administration compared to alternative treatments;
- any restrictions on the use of such product together with other treatments or products;
- market introduction of competitive products;
- publicity concerning such product or competing products and treatments;
- the ability to offer such product for sale at a competitive price;
- the strength of marketing and distribution support; and
- sufficient third-party coverage and adequate reimbursement.

If any products we develop alone or with collaborators do not achieve an adequate level of acceptance, we may not generate significant product revenues, and we may not become profitable.

If we are unable to establish sales and marketing capabilities or enter into agreements with third parties to sell and market any products we develop alone or with collaborators, the commercialization of such products may not be successful if and when they are approved.

We do not have a sales or marketing infrastructure and, as a company, have no experience in the sale, marketing or distribution of biopharmaceutical or other commercial products. To achieve commercial success for any approved products for which we retain sales and marketing responsibilities, we must either develop a sales and marketing organization or outsource these functions to third parties. In the future, we may choose to build a focused sales, marketing and commercial support infrastructure to sell, or participate in sales activities with our collaborators for, certain product candidates if and when they are approved.

There are risks involved with both establishing our own commercial capabilities and entering into arrangements with third parties to perform these services. For example, restricted or closed distribution channels may make it difficult to distribute products to segments of the patient population, and the lack of complementary medicines to be offered by sales personnel may put us at a competitive disadvantage relative to companies with more extensive product lines.

Recruiting and training a sales force or reimbursement specialists are expensive and time consuming and could delay any product launch. If the commercial launch of a product for which we recruit a sales force and establish marketing and other commercialization capabilities is delayed or does not occur for any reason, we would have prematurely or unnecessarily incurred these commercialization expenses, and our investment would be lost if we cannot retain or reposition our commercialization personnel. Factors that may inhibit our efforts to commercialize products on our own include:

- unforeseen costs and expenses associated with creating an independent commercialization organization;
- our inability to recruit, train, retain and effectively manage adequate numbers of effective sales, marketing, customer service and other support personnel, including for reimbursement or medical affairs;
- the inability of sales personnel to educate adequate numbers of physicians on the benefits of our future medicines; and
- the inability of reimbursement professionals to negotiate arrangements for formulary access, reimbursement and other acceptance by payors.

If we choose to enter into arrangements with third parties to perform sales, marketing, commercial support or distribution services, we may not be successful in entering into such arrangements or may be unable to do so on terms that are favorable to us. Entering into such third-party arrangements may subject us to a variety of risks, including:

- product revenues or profitability to us being lower than if we were to market and sell any products we or our collaborators may develop ourselves;
- our inability to exercise direct control over sales and marketing activities and personnel;
- failure of the third parties to devote necessary resources and attention to, or other inability to, sell and market any products we or our collaborators may develop;
- potential disputes with third parties concerning sales and marketing expenses, calculation of royalties and sales and marketing strategies; and
- unforeseen costs and expenses associated with sales and marketing.

If we do not establish effective commercialization capabilities, either on our own or in collaboration with third parties, we will not be successful in commercializing any of our product candidates that may receive approval.

If the market opportunities for any products we develop alone or with collaborators are smaller than our estimates, or if we are unable to successfully identify enough patients, our revenues may be adversely affected.

We focus some of our research and product development on treatments for rare genetic diseases. Our and our collaborators' projections of both the number of people who have these diseases, as well as the subset of people with these diseases who have the potential to benefit from treatment with product candidates we may develop, are based on estimates. These estimates may prove to be incorrect, and new studies may change the estimated incidence or prevalence of these diseases. The number of patients in the United States, Europe and elsewhere may turn out to be lower than expected, and patients may not be amenable to treatment with products that we may develop alone or with collaborators, or may become increasingly difficult to identify or gain access to, any of which would decrease our ability to realize revenue from any such products for such diseases.

The successful commercialization of potential products will depend in part on the extent to which governmental authorities and health insurers establish coverage, and the adequacy of reimbursement levels and pricing policies, and failure to obtain or maintain coverage and adequate reimbursement for any potential products that may receive approval, could limit marketability of those products and decrease our ability to generate revenue.

The availability of coverage and adequacy of reimbursement by government healthcare programs such as Medicare and Medicaid, private health insurers and other third-party payors is essential for most patients to be able to afford prescription medications such as the potential therapeutic products we develop alone or with collaborators. The ability to achieve acceptable levels of coverage and reimbursement for any potential products that may be approved by governmental authorities will have an effect on our and our collaborators' ability to successfully commercialize such products. Even if products we develop alone or with collaborators obtain coverage by a third-party payor, the resulting reimbursement payment rates may not be adequate or may require co-payments that patients find unacceptably high. If coverage and reimbursement in the United States, the EU or elsewhere is not available for any products we develop alone or with collaborators that may be approved, or any reimbursement that may become available is decreased or eliminated in the future, we and our collaborators may be unable to commercialize such products.

There is significant uncertainty related to the insurance coverage and reimbursement of newly approved drugs and biologics. In the United States, third-party payors, including private and governmental payors, such as the Medicare and Medicaid programs, play an

important role in determining the extent to which new drugs and biologics will be covered. In August 2019, the CMS published its decision to cover autologous treatment for cancer with T-cells expressing at least one CAR when administered at healthcare facilities enrolled in the FDA risk evaluation and mitigation strategies and used for an FDA-approved indication or for other uses when the product has been FDA-approved and the use is supported in one or more CMS-approved compendia. The Medicare and Medicaid programs increasingly are used as models in the United States for how private payors and other governmental payors develop their coverage and reimbursement policies for drugs and biologics. Some third-party payors may require pre-approval of coverage for new or innovative devices or drug therapies before they will reimburse healthcare providers who use such therapies. We cannot predict at this time what third-party payors will decide with respect to the coverage and reimbursement for any product that we develop alone or with collaborators.

No uniform policy for coverage and reimbursement for products exists among third-party payors in the United States. Therefore, coverage and reimbursement for products can differ significantly from payor to payor. As a result, the coverage determination process is often a time-consuming and costly process that will require us or our collaborators to provide scientific and clinical support for the use of any potential products that may be approved to each payor separately, with no assurance that coverage and adequate reimbursement will be applied consistently or obtained in the first instance. Furthermore, rules and regulations regarding reimbursement change frequently, in some cases on short notice. Obtaining coverage and adequate reimbursement for products we develop alone or with collaborators may be particularly difficult because of the higher prices often associated with drugs administered under the supervision of a physician. In certain instances, payors may not separately reimburse for the product itself, but only for the treatments or procedures in which such product is used. A decision by a third-party payor not to cover or separately reimburse for products that we develop alone or with collaborators or procedures using such products, could reduce physician utilization of any such products that may receive approval.

Third-party payors are increasingly challenging prices charged for pharmaceutical products and services, and many third-party payors may refuse to provide coverage and reimbursement for particular drugs or biologics when an equivalent generic drug, biosimilar or a less expensive therapy is available. If approved, it is possible that a third-party payor may consider any products that we develop alone or with collaborators as substitutable and only offer to reimburse patients for the less expensive product. Pricing of existing third-party therapeutics may limit the amount we will be able to charge for any products that may receive approval even if we or our collaborators show improved efficacy or improved convenience of administration such products. These payors may deny or revoke the reimbursement status of a given product or establish prices for new or existing marketed products at levels that are too low to enable us to realize an appropriate return on our investment in the product. If reimbursement is not available or is available only at limited levels, we or our collaborators may not be able to successfully commercialize any of the products that we develop, even if approved, and we may not be able to obtain a satisfactory financial return on them. Moreover, increasing efforts by governmental and third-party payors in the United States and abroad to cap or reduce healthcare costs may cause such organizations to limit both coverage and the level of reimbursement for newly approved products and, as a result, they may not cover or provide adequate payment for any products we develop alone or with collaborators that may receive approval. We expect to experience pricing pressures in connection with the sale of any products that may receive approval due to the trend toward managed health care, the increasing influence of health maintenance organizations and additional legislative changes. The downward pressure on healthcare costs in general, particularly prescription drugs and biologics and surgical procedures and other treatments, has become intense. As a result, increasingly high barriers are being erected to the entry of new products.

Outside the United States, international operations are generally subject to extensive governmental price controls and other market regulations, and we believe the increasing emphasis on cost-containment initiatives in Europe and elsewhere have and will continue to put pressure on the pricing and usage of any products we develop alone or with collaborators that may receive approval. In many countries, the prices of medical products are subject to varying price control mechanisms as part of national health systems. Other countries allow companies to fix their own prices for medical products, but monitor and control company profits. Additional international price controls or other changes in pricing regulation could restrict the amount that we or our collaborators are able to charge for products that we develop that may receive approval. Accordingly, in markets outside the United States, the reimbursement for such products may be reduced compared with the United States and may be insufficient to generate commercially reasonable revenue and profits.

Our product candidates for which we intend to seek approval as biologic products may face competition sooner than anticipated.

If we are successful in achieving regulatory approval to commercialize any biologic product candidate we develop alone or with collaborators, it may face competition from biosimilar products. In the United States, our product candidates are regulated by the FDA as biologic products subject to approval under the BLA pathway. The BPCIA created an abbreviated pathway for the approval of biosimilar and interchangeable biologic products following the approval of an original BLA. The abbreviated regulatory pathway establishes legal authority for the FDA to review and approve biosimilar biologics, including the possible designation of a biosimilar as “interchangeable” based on its similarity to an existing brand product. Under the BPCIA, an application for a biosimilar product may not be submitted until four years following the date that the reference product was first licensed by the FDA. In addition, the approval of a biosimilar product may not be made effective by the FDA until 12 years after the reference product was first licensed by

the FDA. During this 12-year period of exclusivity, another company may still market a competing version of the reference product if the FDA approves a full BLA for the competing product containing the sponsor's own preclinical data and data from adequate and well-controlled clinical trials to demonstrate the safety, purity and potency of their product.

We believe that any of our product candidates that are approved as biological products under a BLA should qualify for the 12-year period of exclusivity. However, there is a risk that this exclusivity could be shortened due to congressional action or otherwise, or that the FDA will not consider such product candidates to be reference products for competing products, potentially creating the opportunity for generic competition sooner than anticipated. If competitors are able to obtain marketing approval for biosimilars referencing any products that we develop alone or with collaborators that may be approved, such products may become subject to competition from such biosimilars, with the attendant competitive pressure and potential adverse consequences.

Jurisdictions in addition to the U.S. have established abbreviated pathways for regulatory approval of biological products that are biosimilar to earlier approved reference products. For example, the EU has had an established regulatory pathway for biosimilars since 2006.

Risks Related to Our Organization, Structure and Operations

The ongoing novel coronavirus disease, COVID-19 has impacted, and may continue to impact, our business, and any other pandemic, epidemic or outbreak of an infectious disease may materially and adversely impact our business, including our preclinical studies and clinical trials.

In March 2020, the World Health Organization designated the outbreak of the novel strain of coronavirus known as COVID-19 as a global pandemic, and COVID-19 and its variants have spread to multiple global regions, including the United States and Europe. The ongoing pandemic and government measures taken in response have also had a significant impact, both direct and indirect, on businesses and commerce, as worker shortages have occurred; supply chains and manufacturing, including our own, have been disrupted; facilities and production have been suspended; and demand for certain goods and services, such as medical services and supplies, has spiked, while demand for other goods and services, such as travel, has fallen. In response to the impact of COVID-19 and its variants and in accordance with local guidelines, we have implemented measures to mitigate exposure risks and support operations. The health and safety program we have initiated requiring mandatory use of face masks, mandatory vaccinations, social distancing, sanitary handwashing practices, use of personal protective equipment stations, stringent cleaning and sanitization of all facilities and measures to reduce total occupancy in facilities, as well as temperature and symptom screening procedures at each location may not sufficiently protect our employees. We have communicated to our employees that based on their comfort level, regardless of role, they may elect not to come to work. Any additional resurgence of outbreaks, new regulatory orders or guidance, or self-imposed protective measures we impose could require reversal of our previously eased restrictions to our on-site activities and, as a result, adversely impact our business, including our preclinical studies and clinical trials.

As a result of the COVID-19 pandemic and its variants or other pandemic, epidemic or outbreak of an infectious disease, we have and may continue to experience disruptions that could severely impact our business, preclinical studies and clinical trials, including:

- delays or difficulties in enrolling patients in our clinical trials;
- delays or difficulties in clinical site initiation, including difficulties in recruiting clinical site investigators, clinical site staff and IRB approval required to begin a clinical trial at a site;
- diversion of healthcare resources away from the conduct of clinical trials, including the diversion of hospitals serving as our clinical trial sites and hospital staff supporting the conduct of our clinical trials;
- interruption of key clinical trial activities, such as clinical trial site data monitoring, due to limitations on travel imposed or recommended by federal or state governments, employers and others or interruption of clinical trial subject visits and study procedures, which may impact the integrity of subject data and clinical study endpoints;
- interruption or delays in the operations of the FDA or other regulatory authorities, which may impact review and approval timelines;
- interruption in manufacturing, including, without limitation interruption of, or delays in receiving, supplies of our product candidates from our contract manufacturing organizations due to staffing shortages, production slowdowns or stoppages and disruptions in delivery systems;
- interruptions in preclinical studies due to restricted or limited operations at our laboratory facility;
- limitations on employee resources that would otherwise be focused on the conduct of our preclinical studies and clinical trials, including because of sickness of employees or their families or the desire of employees to avoid contact with large groups of people; and

- interruption or delays to our sourced discovery and clinical activities.

The COVID-19 pandemic and its variants continues to evolve. Disruptions, supply chain constraints and timeline impacts, competing resource demands and safety concerns caused by the COVID-19 pandemic and its variants have caused, and may continue to cause, delays in our clinical trial site activation and our ability to enroll patients. Supply chain constraints affecting the industry have also impacted our business. Lead times for certain single-use components have been extended, and global impacts from the COVID-19 pandemic could lead to longer timelines or greater costs in the future. Additionally, we have experienced and may also experience other difficulties, disruptions or delays in conducting preclinical studies or initiating, enrolling, conducting or completing our planned and ongoing clinical trials, and we may incur other unforeseen costs as a result. The extent to which the COVID-19 pandemic impacts our business, preclinical studies and clinical trials will depend on future developments, which are highly uncertain and cannot be predicted with confidence, such as the duration of the pandemic, emergence of additional new variants, travel restrictions and social distancing in the United States and other countries, business closures or business disruptions and the effectiveness of actions taken in the United States and other countries to contain and treat the disease. If we or any of the third parties with whom we engage were to experience shutdowns or any further business disruptions, our ability to conduct our business in the manner and on the timelines presently planned could be materially and negatively impacted. Additionally, the magnitude of the economic impact brought by and the duration of COVID-19 pandemic and its variants continues to be difficult to assess or predict and may continue to result in significant disruption of global financial markets, which may reduce our ability to access capital and negatively affect our liquidity.

We will need to expand our organization, and we may experience difficulties in managing this growth, which could disrupt our operations.

As of December 31, 2021, we had 198 full-time employees. We will need to significantly expand our organization, and our future financial performance, ability to develop and commercialize product candidates alone or with collaborators and ability to compete effectively will depend in part on our ability to effectively manage any future growth. We may have difficulty identifying, hiring and integrating new personnel. Many of the biotechnology companies that we compete against for qualified personnel and consultants have greater financial and other resources, different risk profiles and a longer history than we do. If we are unable to continue to attract and retain high-quality personnel and consultants, the rate and success at which we can identify and develop product candidates, enter into collaborative arrangements and otherwise operate our business will be limited.

Future growth would impose significant additional responsibilities on our management, including the need to identify, recruit, maintain, motivate and integrate additional employees, consultants and contractors.

Management may need to divert a disproportionate amount of its attention away from our day-to-day activities and devote a substantial amount of time to managing these growth activities. Due to our limited financial resources and the limited experience of our management team in managing a company with such anticipated growth, we may not be able to effectively manage the expected expansion of our operations or recruit and train additional qualified personnel. Moreover, the expected physical expansion of our operations may lead to significant costs and may divert our management and business development resources from other projects, such as the development of product candidates. If we are not able to effectively manage the expansion of our operations, it may result in weaknesses in our infrastructure, increase our expenses more than expected, give rise to operational mistakes, loss of business opportunities, loss of employees and reduced productivity. Our future financial performance, ability to successfully commercialize any of our product candidates and our ability to compete effectively will depend, in part, on our ability to effectively manage any future growth.

We may engage in transactions that could disrupt our business, cause dilution to our stockholders or reduce our financial resources.

In the future, we may enter into transactions to acquire or in-license rights to product candidates, products or technologies or to acquire other businesses. If we do identify suitable candidates, we may not be able to enter into such transactions on favorable terms, or at all. Any such acquisitions or in-licenses may not strengthen our competitive position, and these transactions may be viewed negatively by customers or investors. We may decide to incur debt in connection with an acquisition or in-license, which may negatively impact our financial condition and restrict our operations, or issue our common stock or other equity securities to the stockholders of the acquired company, which would reduce the percentage ownership of our existing stockholders. We could incur losses resulting from undiscovered liabilities of the acquired business that are not covered by the indemnification we may obtain from the sellers of the acquired business. In addition, we may not be able to successfully integrate the acquired personnel, technologies and operations into our existing business in an effective, timely and non-disruptive manner. Such transactions may also divert management attention from day-to-day responsibilities, increase our expenses and reduce our cash available for operations and other uses. We cannot predict the number, timing or size of future acquisitions or in-licenses or the effect that they might have on our operating results.

Our future success depends on our key executives, as well as attracting, retaining and motivating qualified personnel.

We are highly dependent on the research and development experience, technical skills, leadership and continued service of certain members of our management and scientific teams. Although we have formal employment agreements with our executive officers, these agreements do not prevent them from terminating their employment with us at any time. The loss of the services of any of these persons could impede the achievement of our research, development and commercialization objectives.

Recruiting and retaining qualified scientific, clinical, manufacturing and, if we retain commercialization responsibility for any product candidate we develop alone or with collaborators, sales and marketing personnel will also be critical to our success. For instance, we recently appointed a new Chief Executive Officer and, earlier in 2021, appointed a new Chief Medical Officer. With the resignation of our Chief Operating Officer ("COO") earlier in 2021, we have reassigned the responsibilities of the COO to other members of the management and senior leadership team. We may not be able to attract new or successor personnel on acceptable terms or at all given the competition among numerous pharmaceutical and biotechnology companies for similar personnel. We also experience competition for the hiring of scientific and clinical personnel from universities and research institutions. In addition, we rely on consultants and advisors, including scientific and clinical advisors, to assist us in formulating our research and development and commercialization strategies. Our consultants and advisors may be employed by employers other than us and may have commitments under consulting or advisory contracts with other entities that may limit their availability to us. The inability to recruit, integrate, motivate and retain additional skilled and qualified personnel, or the loss of services of certain executives, key employees, consultants or advisors, may impede the progress of our research, development and commercialization objectives and have a material adverse effect on our business.

We are subject to increased costs as a result of operating as a public company, and our management will be required to devote substantial time to maintaining compliance initiatives and corporate governance practices, including establishing and maintaining proper and effective internal control over financial reporting.

As a public company, we have incurred and will continue to incur significant legal, accounting and other expenses that we did not incur as a private company. We are subject to the Securities Exchange Act of 1934, as amended, or the Exchange Act, including the reporting requirements thereunder, the Sarbanes-Oxley Act of 2002, the Dodd-Frank Wall Street Reform and Consumer Protection Act, the listing requirements of The Nasdaq Stock Market LLC ("Nasdaq") and other applicable securities rules and regulations, including requirements related to the establishment and maintenance of effective disclosure and financial controls and corporate governance practices. Our management and other personnel will need to continue to devote a substantial amount of time to these compliance initiatives. Moreover, these rules and regulations have increased our legal and financial compliance costs, making some activities more difficult, time consuming or costly, and increasing demand on our systems and resources.

Pursuant to Section 404 of the Sarbanes-Oxley Act of 2002 ("Section 404") we are required to furnish a report by our management on our internal control over financial reporting. However, while we remain an emerging growth company, we will not be required to include an attestation report on internal control over financial reporting issued by our independent registered public accounting firm. To achieve compliance with Section 404 of the Sarbanes-Oxley Act within the prescribed period, we will be engaged in a process to document and evaluate our internal control over financial reporting, which is both costly and challenging. We may need to hire more employees in the future or engage outside consultants to comply with these requirements, which will further increase our costs and expenses. If we fail to implement the requirements of Section 404 of the Sarbanes-Oxley Act in the required timeframe, we may be subject to sanctions or investigations by regulatory authorities, including the SEC and Nasdaq. Furthermore, if we are unable to conclude that our internal control over financial reporting is effective, our investors may lose confidence in the accuracy and completeness of our financial reports, the market price of our common stock could decline, and we could be subject to sanctions or investigations by regulatory authorities. Failure to implement or maintain an effective internal control system could also restrict our future access to the capital markets.

Our business and operations may suffer in the event of system failures or security breaches which could materially affect our results.

Despite the implementation of security measures, our information technology systems, as well as those of third parties with which we have relationships, are vulnerable to attack and damage from computer viruses and malware (e.g., ransomware), unauthorized access, natural and manmade disasters, terrorism, war and telecommunication and electrical failures, malfeasance by external or internal parties, and human error (e.g., social engineering, phishing). The aforementioned third parties with which we have relationships include service providers and vendors who provide to us a broad array of software and other technologies as well as products, services and functions (e.g., human resources, finance, communications, data transmission, risk, compliance) that enable us to conduct, monitor and/or protect our business, operations, systems and data assets.

Attacks upon information technology systems are increasing in their frequency, levels of persistence, sophistication and intensity, and are being conducted by sophisticated and organized groups and individuals with a wide range of motives and expertise. Furthermore,

because the technologies used to obtain unauthorized access to, or to sabotage or disrupt, systems change frequently and often are not recognized until launched against a target, we may be unable to anticipate these techniques or implement adequate preventative measures. We may also experience security breaches that may remain undetected for an extended period. Even if identified, we may be unable to adequately investigate or remediate incidents or breaches due to attackers increasingly using tools and techniques that are designed to circumvent controls, to avoid detection, and to remove or obfuscate forensic evidence. As a result of the COVID-19 pandemic and its variants, we may also face increased cybersecurity risks due to our reliance on internet technology and the number of our and our service providers' employees who are (and may continue to be) working remotely, which may create additional opportunities for cybercriminals to exploit vulnerabilities. The White House, SEC and other regulators have also increased their focus on companies' cybersecurity vulnerabilities and risks.

We and certain of our service providers are from time to time, subject to cyberattacks and security incidents. While we do not believe that we have experienced any significant system failure, accident or security breach to date, if such an event were to occur and cause interruptions in our or our critical third parties' operations, it could result in delays and/or material disruptions of our research and development programs, our operations and ultimately, our financial results. For example, the loss of trial data from completed, ongoing or planned trials could result in delays in our regulatory approval efforts and significantly increase our costs to recover or reproduce the data. To the extent that any disruption or security breach were to result in a loss of or damage to data or applications, or inappropriate disclosure of personal, confidential or proprietary information, we could incur liability due to delays in the development of our product candidates and/or due to reputational harm, litigation, regulatory investigations and enforcement, fines and penalties, or increased costs of compliance and system remediation. Any losses, costs or liabilities may not be covered by, or may exceed the coverage limits of, any or all applicable insurance policies.

Federal, state and foreign legislators and regulators globally have enacted or proposed legal requirements regarding the collection, distribution, disclosure, use, processing, security and storage of personally identifiable information and other types of regulated data, including online information and data online. In the ordinary course of our business, we and third parties with which we have relationships will continue to collect and store sensitive data, including intellectual property, clinical trial data, proprietary business information, personal data and personally identifiable information of our clinical trial subjects and employees, in data centers and on networks. The secure processing, maintenance and transmission of this information is critical to our operations. Despite security measures that we and our critical third parties (e.g., collaborators) implement, our information technology and infrastructure may be vulnerable to attacks by hackers or internal bad actors, breaches due to human error, technical vulnerabilities, malfeasance or other disruptions. A number of proposed and enacted federal, state and international laws and regulations obligate companies to notify individuals and other parties of security breaches involving particular types of information, which could result from breaches experienced by us or by third parties, including collaborators, vendors, contractors or other organizations with which we have formed relationships that involve the handling or processing of such information.

Although, to our knowledge, neither we nor any such third parties have experienced any material security breach or incident involving the unauthorized disclosure or misuse of sensitive information, and even though we may have contractual protections with third parties who process or handle sensitive information, any breach could compromise our or their networks and the information stored there could be accessed, publicly disclosed, lost or stolen. Any such access, disclosure, notifications, follow-up actions related to such a security breach or other loss of information could result in legal claims or proceedings, liability under laws that protect the privacy of personal information and significant costs, including regulatory penalties, fines and legal expenses, and such an event could disrupt our operations, cause us to incur remediation costs, damage our reputation and cause a loss of confidence in us and our or such third parties' ability to conduct clinical trials, which could adversely affect our reputation and delay our research and development programs.

Our insurance policies are expensive and protect us only from some business risks, which leaves us exposed to significant uninsured liabilities.

We do not carry insurance for all categories of risk that our business may encounter. If we obtain marketing approval for any product candidates that we or our collaborators may develop, we intend to acquire insurance coverage to include the sale of commercial products, but we may be unable to obtain such insurance on commercially reasonable terms or in adequate amounts. We do not carry specific biological or hazardous waste insurance coverage, and our property, casualty and general liability insurance policies specifically exclude coverage for damages and fines arising from biological or hazardous waste exposure or contamination.

Accordingly, in the event of contamination or injury, we could be held liable for damages or be penalized with fines in an amount exceeding our resources, and clinical trials or regulatory approvals for any of our product candidates could be suspended. We also expect that operating as a public company will make it more expensive for us to obtain director and officer liability insurance, and we may be required to accept reduced policy limits and coverage or incur substantially higher costs to obtain the same or similar coverage. As a result, it may be more difficult for us to attract and retain qualified individuals to serve on our board of directors, our board committees or as our executive officers.

Insurance coverage is becoming increasingly expensive, and in the future we may not be able to maintain insurance coverage at a reasonable cost or in sufficient amounts to protect us against losses. We do not know if we will be able to maintain existing insurance with adequate levels of coverage, and any liability insurance coverage we acquire in the future may not be sufficient to reimburse us for any expenses or losses we may suffer. A successful liability claim or series of claims brought against us could require us to pay substantial amounts and cause our share price to decline and, if judgments exceed our insurance coverage, could adversely affect our results of operations and business, including preventing or limiting the development and commercialization of any product candidates that we or our collaborators may develop.

If we or any of our contract manufacturers or other suppliers fail to comply with environmental, health and safety laws and regulations, we could become subject to fines or penalties or incur significant costs.

We and any of our contract manufacturers and suppliers are subject to numerous federal, state and local environmental, health and safety laws, regulations and permitting requirements, including those governing laboratory procedures; the generation, handling, use, storage, treatment and disposal of hazardous and regulated materials and wastes; the emission and discharge of hazardous materials into the ground, air and water; and employee health and safety. Our operations involve the use of hazardous and flammable materials, including chemicals and biological and radioactive materials. Our operations also produce hazardous waste. We generally contract with third parties for the disposal of these materials and wastes. We cannot eliminate the risk of contamination or injury from these materials. In the event of contamination or injury resulting from our use of hazardous materials, we could be held liable for any resulting damages, and any liability could exceed our resources. Under certain environmental laws, we could be held responsible for costs relating to any contamination at our current or past facilities and at third-party facilities. We also could incur significant costs associated with civil or criminal fines and penalties.

Compliance with applicable environmental laws and regulations may be expensive, and current or future environmental laws and regulations may impair our research and product development efforts. In addition, we cannot entirely eliminate the risk of accidental injury or contamination from these materials or wastes.

Although we maintain workers' compensation insurance to cover us for costs and expenses we may incur due to injuries to our employees resulting from the use of hazardous materials, this insurance may not provide adequate coverage against potential liabilities. We do not carry specific biological or hazardous waste insurance coverage, and our property, casualty and general liability insurance policies (under which we currently have an aggregate of approximately $10 million in coverage) specifically exclude coverage for damages and fines arising from biological or hazardous waste exposure or contamination. Accordingly, in the event of contamination or injury, we could be held liable for damages or be penalized with fines in an amount exceeding our resources, and our clinical trials or regulatory approvals for any product candidate we develop alone or with collaborators could be suspended, which could have a material adverse effect on our business and financial condition.

In addition, we may incur substantial costs in order to comply with current or future environmental, health and safety laws, regulations and permitting requirements, and any third-party contract manufacturers and suppliers we engage will also be subject to such current and future regulations and requirements. These current or future laws, regulations and permitting requirements may impair our research, development or production efforts. Failure to comply with these laws, regulations and permitting requirements, either by us or by any third-party contract manufacturers and suppliers we engage, also may result in substantial fines, penalties or other sanctions or business disruption.

Our business operations, including our current and future relationships with third parties, may expose us to penalties for potential misconduct or improper activity, including non-compliance with regulatory standards and requirements.

Complex laws constrain our business and the financial arrangements and relationships through which we conduct our operations, including how we may research, market, sell and distribute product candidates alone or with collaborators. We are exposed to the risk of fraud or other misconduct by our employees, consultants and collaborators and, if we or our collaborators commence clinical trials and proceed to commercialization, our principal investigators and commercial partners, as well as healthcare professionals, third-party payors, patient organizations and customers. For example, misconduct by these parties could include intentional failures to comply with FDA regulations or the regulations applicable in the EU and other jurisdictions, provide accurate information to the FDA and other regulatory authorities, comply with healthcare fraud and abuse laws and regulations in the United States and abroad, report financial information or data accurately or disclose unauthorized activities to us. In particular, sales, marketing and business arrangements in the healthcare industry are subject to extensive laws and regulations intended to prevent fraud, misconduct, kickbacks, false and/or misleading statements, corruption of government officials, self-dealing and other abusive practices. These laws and regulations restrict or prohibit a wide range of pricing, discounting, marketing, promotion, sales commission and customer incentive programs and other business arrangements. Such misconduct also could involve the improper use or misrepresentation of information obtained in the course of clinical trials, creating fraudulent data in preclinical studies or clinical trials, illegal misappropriation of study materials or other property, or improper interactions with the FDA or other regulatory authorities, which could result in regulatory sanctions and cause serious harm to our or our collaborators' reputations.

Ensuring that our internal operations and current and future business arrangements with third parties comply with applicable healthcare laws and regulations will involve substantial costs. Additionally, we are subject to the risk that a person or government could allege such fraud or other misconduct, even if none occurred. It is possible that governmental authorities will conclude that our business practices do not comply with current or future statutes, regulations, agency guidance or case law involving applicable fraud and abuse or other healthcare laws and regulations. If our operations are found to be in violation of any of the laws described above or any other governmental laws and regulations that may apply to us, we may be subject to significant penalties, including civil, criminal and administrative penalties, damages, fines, exclusion from government-funded healthcare programs, such as Medicare and Medicaid or similar programs in other countries or jurisdictions, additional reporting requirements and oversight if subject to a corporate integrity agreement or similar agreement to resolve allegations of non-compliance with these laws, disgorgement, individual imprisonment, contractual damages, reputational harm, diminished profits and the curtailment or restructuring of our operations. If any of the physicians or other providers or entities with whom we expect to do business are found to not be in compliance with applicable laws, they may be subject to similar penalties, such as criminal, civil or administrative sanctions, including exclusions from government-funded healthcare programs and imprisonment, which could affect our ability to operate our business. Further, defending against any such actions can be costly and time-consuming and may require significant personnel resources. Therefore, even if we are successful in defending against any such actions that may be brought against us, our business may be impaired.

We have adopted policies applicable to all of our employees, but it is not always possible to identify and deter employee misconduct, and the precautions we take to detect and prevent such activity may not be effective in controlling unknown or unmanaged risks or losses or in protecting us from government investigations or other actions or lawsuits stemming from a failure to comply with applicable laws or regulations. Additionally, we are subject to the risk that a person could allege such fraud or other misconduct, even if none occurred. If any such actions are instituted against us, and we are not successful in defending ourselves or asserting our rights, those actions could result in the imposition of any of the penalties discussed above and have a significant impact on our business and financial condition.

We are subject to complex tax rules relating to our business, and any audits, investigations or tax proceedings could have a material adverse effect on our business, results of operations and financial condition.

We are subject to income and non-income taxes in the United States. Income tax accounting often involves complex issues, and judgment is required in determining our provision for income taxes and other tax liabilities. In May 2018 we formed a subsidiary in Australia, which was subsequently transferred to New Elo in December 2021. In June 2019 we formed a subsidiary in the UK, and we may operate in other foreign jurisdictions in the future. We could become subject to income and non-income taxes in foreign jurisdictions as well. In addition, many jurisdictions have detailed transfer pricing rules, which require that all transactions with non-resident related parties be priced using arm's length pricing principles within the meaning of such rules. The application of withholding tax, goods and services tax, sales taxes and other non-income taxes is not always clear and we may be subject to tax audits relating to such withholding or non-income taxes. We believe that our tax positions are reasonable and our tax reserves are adequate to cover any potential liability. We are currently not subject to any tax audits. However, the Internal Revenue Service ("IRS") or other taxing authorities may disagree with our positions. If the IRS or any other tax authorities were successful in challenging our positions, we may be liable for additional tax and penalties and interest related thereto or other taxes, as applicable, in excess of any reserves established therefor, which may have a significant impact on our results and operations and future cash flow.

We may not be able to utilize all, or any, of our net operating loss carryforwards.

We have incurred substantial losses during our history, do not expect to become profitable in the near future, and we may not achieve profitability. As of December 31, 2021, we had U.S. federal, state, and foreign net operating loss ("NOL") carryforwards of $181.0 million, $122.2 million, and $0.4 million, respectively. Our federal NOL carryforwards of $19.7 million will begin to expire in 2030 while the remaining federal NOL carryforwards of $161.2 million carry forward indefinitely. The state NOL carryforwards begin to expire in 2025. In addition, as of December 31, 2021, we have U.S. federal and state research and development ("R&D") tax credits of $11.4 million and an amount less than $0.1 million available to offset future U.S. federal and state income taxes, which begin to expire in 2027 and 2030, respectively. At December 31, 2021 and December 31, 2020, we had federal Orphan Drug credits of $9.5 million and $6.0 million, respectively, which begin to expire in 2038.

Changes in tax laws or regulations may adversely impact our ability to utilize all, or any, of our NOL carryforwards. For example, legislation enacted in 2017, informally titled the Tax Cuts and Jobs Act (the "TCJA"), significantly revised the Internal Revenue Code of 1986, as amended. Future guidance from the IRS and other tax authorities with respect to the TCJA may affect us, and certain aspects of the TCJA could be repealed or modified in future legislation. For example, the Coronavirus Aid, Relief, and Economic Security Act (the "CARES Act") modified certain provisions of the TCJA. Under the CARES Act, NOLs arising in a tax year beginning after December 31, 2017, and before January 1, 2021, generally may now be carried back five years. Under the TCJA, as modified by the CARES Act, unused losses generated in taxable years ending after December 31, 2017 will not expire and may be carried forward indefinitely, but the deductibility of such NOLs in tax years beginning after December 31, 2020, is limited to 80% of taxable income. It is uncertain if and to what extent various states will conform to the to the TCJA or the CARES Act.

As of December 31, 2021, we have a valuation allowance for the full amount of our net deferred tax assets as the realization of the net deferred tax assets is not determined to be more likely than not. In addition, Sections 382 and 383 of the Code limit a corporation's ability to utilize its NOL carryforwards and certain other tax attributes (including research credits) to offset any future taxable income or tax if the corporation experiences a cumulative ownership change of more than 50% over any rolling three-year period. State NOL carryforwards (and certain other tax attributes) may be similarly limited. A Section 382 ownership change can therefore result in significantly greater tax liabilities than a corporation would incur in the absence of such a change, and any increased liabilities could adversely affect the corporation's business, results of operations, financial condition and cash flow. We have not yet determined if any prior change in the ownership of our equity or any change in such ownership in connection with our IPO, would trigger a Section 382 ownership change. It is possible that such a Section 382 ownership change has already occurred in prior periods. Furthermore, additional ownership changes may occur in the future as a result of events over which we will have little or no control, including purchases and sales of our equity by our 5% stockholders, the emergence of new 5% stockholders, additional equity offerings or redemptions of our stock or certain changes in the ownership of any of our 5% stockholders. As a result, our pre-2018 NOL carryforwards (and research tax credits) may expire prior to being used, and our NOL carryforwards and tax credits generated in 2018 and thereafter will be subject to a percentage limitation, upon an ownership change. Similar provisions of state tax law may also apply to limit our use of accumulated state tax attributes. As a result, even if we attain profitability, we may be unable to use all or a material portion of our NOLs and other tax attributes, which could adversely affect our future cash flows.

Risks Related to Our Reliance on Third Parties

We have entered into significant arrangements with collaborators and expect to depend on collaborations with third parties for certain research, development and commercialization activities, and if any such collaborations are not successful, it may harm our business and prospects.

We have sought in the past, and anticipate that we will continue to seek in the future, third-party collaborators for the research, development and commercialization of certain product candidates and the research and development of certain technologies. For example, we are party to the Development and License Agreement with Lilly. Under this agreement, we are focused on research and development of *in vivo* gene editing products that utilize or incorporate our ARCUS nucleases. Our likely collaborators for other product research and development arrangements include large and mid-size pharmaceutical and biotechnology companies, and our likely collaborators for other technology research and development arrangements include universities and other research institutions.

Working with collaborators poses several significant risks. We have limited control over the amount and timing of resources that our collaborators dedicate to the product candidates or technologies we may seek to develop with them. A variety of factors may impact resource allocation decisions of collaborators, such as study or trial results, changes in the collaborator's strategic focus, turnover in personnel responsible for the development activities, financial capacity or external factors such as a business combination or change in control that diverts resources or creates competing priorities. Collaboration agreements may not lead to development or commercialization of product candidates or the development of technologies in the most efficient manner or at all. Resource allocation and other developmental decisions made by our collaborators may result in the delay or termination of research programs, studies or trials, repetition of or initiation of new studies or trials or provision of insufficient funding or resources for the completion of studies or trials or the successful marketing and distribution of any product candidates that may receive approval. Collaborators could independently develop, or develop with third parties, product candidates or technologies that compete directly or indirectly with our product candidates or technologies if the collaborators believe that competitive products or technologies are more likely to be successfully developed or can be commercialized under terms that are more economically attractive than ours. Collaborators may not properly obtain, maintain, enforce or defend our intellectual property or proprietary rights or may use our proprietary information in such a way that could jeopardize or invalidate our proprietary information or expose us to potential litigation. Disputes may arise between us and our collaborators that result in the delay or termination of the research, development or commercialization activities or that result in costly litigation or arbitration that diverts management attention and resources.

Our ability to generate revenues from these arrangements will depend on our collaborators' abilities to successfully perform the functions assigned to them in these arrangements. If our collaborations do not result in the successful development and commercialization of product candidates or technologies, or if one of our collaborators terminates its agreement with us, we may not receive any future funding or milestone or royalty payments under the collaboration. If we do not receive the funding we expect under these agreements, our development of product candidates or technologies could be delayed, and we may need additional resources to develop such product candidates or technologies. For example, we waived earned, but unpaid milestone payments in connection with the termination of the Servier Agreement. Further, as a result of the termination of the Gilead Agreement, we are no longer entitled to receive certain milestone payments, our submission of an IND for our *in vivo* chronic HBV program has been delayed and we are currently exploring alternative opportunities to enable to continued development of ARCUS-based HBV therapies. In connection with this termination, and if any of our other collaborators terminates its agreement with us, we may be unable to find a suitable replacement collaborator or any replacement collaborator or attract new collaborators and may need to raise additional capital to pursue further development or commercialization of the applicable product candidates or technologies. These events could delay development programs, negatively impact the perception of our company in business and financial communities or cause us to have to

cease development of the product candidate covered by the collaboration arrangement. Failure to develop or maintain relationships with any current collaborators could result in the loss of opportunity to work with that collaborator or reputational damage that could impact our relationships with other collaborators in the relatively small industry communities in which we operate. Moreover, all of the risks relating to product development, regulatory approval and commercialization described in this Annual Report on Form 10-K apply to the activities of our collaborators. If our existing collaboration agreements or any collaborative or strategic relationships we may establish in the future are not effective and successful, it may damage our reputation and business prospects, delay or prevent the development and commercialization of product candidates and inhibit or preclude our ability to realize any revenues.

If we are not able to establish collaborations on commercially reasonable terms, we may have to alter our research, development and commercialization plans.

Our research and product development programs and the potential commercialization of any product candidates we develop alone or with collaborators will require substantial additional cash to fund expenses, and we expect that we will continue to seek collaborative arrangements with others in connection with the development and potential commercialization of current and future product candidates or the development of ancillary technologies. We face significant competition in establishing relationships with appropriate collaborators. In addition, there have been a significant number of recent business combinations among large pharmaceutical companies that have resulted in a reduced number of potential future collaborators. Whether we reach a definitive agreement for a collaboration will depend, among other things, upon our assessment of the collaborator's resources and expertise, the terms and conditions of the proposed collaboration and the proposed collaborator's evaluation of a number of factors. Those factors may include, among other things and as applicable for the type of potential product or technology, an assessment of the opportunities and risks of our technology, the design or results of studies or trials, the likelihood of approval, if necessary, by the FDA or similar regulatory authorities outside the United States, the potential market for the subject product candidate, the costs and complexities of manufacturing and delivering such product candidate to patients, the potential of competing products and technologies and industry and market conditions generally.

Current or future collaborators may also consider alternative product candidates or technologies for similar indications that may be available to collaborate on and whether such a collaboration could be more attractive than the one with us. Additionally, we may be restricted under existing collaboration agreements from entering into future agreements on certain terms or for certain development activities with potential collaborators. For example, we have granted exclusive rights or options to Lilly for certain targets, and during the term of our collaboration agreement we will be restricted from granting rights to other parties to use our ARCUS technology to pursue potential products that address those targets. Similarly, our collaboration agreements have in the past and may in the future contain non-competition provisions that could limit our ability to enter into strategic collaborations with future collaborators.

Collaborations are complex and time-consuming to negotiate and document. We may not be able to negotiate collaborations on a timely basis, on acceptable terms, or at all. If we do enter into additional collaboration agreements, the negotiated terms may force us to relinquish rights that diminish our potential profitability from development and commercialization of the subject product candidates or others. If we are unable to enter into additional collaboration agreements, we may have to curtail the research and development of the product candidate or technology for which we are seeking to collaborate, reduce or delay research and development programs, delay potential commercialization timelines, reduce the scope of any sales or marketing activities or undertake research, development or commercialization activities at our own expense. If we elect to increase our expenditures to fund research, development or commercialization activities on our own, we may need to obtain additional capital, which may not be available to us on acceptable terms or at all.

We rely on third parties to conduct, supervise and monitor our clinical trials and some aspects of our research and preclinical testing, and if those third parties do not successfully carry out their contractual duties, comply with regulatory requirements, or otherwise perform in a satisfactory manner, we may not be able to obtain regulatory approval or commercialize product candidates, or such approval or commercialization may be delayed, and our business may be substantially harmed.

We rely on medical institutions, universities, clinical investigators, contract laboratories and other third parties, such as CROs, to conduct preclinical studies and future clinical trials for our product candidates. Nevertheless, we will be responsible for ensuring that each of our studies and trials is conducted in accordance with the applicable protocol, legal and regulatory requirements and scientific standards, and our reliance on such third parties will not relieve us of our regulatory responsibilities.

Although we intend to design the trials for our product candidates either alone or with collaborators, third parties may conduct all of the trials. As a result, many important aspects of our research and development programs, including their conduct and timing, will be outside of our direct control. Our reliance on third parties to conduct future studies and trials will also result in less direct control over the management of data developed through studies and trials than would be the case if we were relying entirely upon our own staff. Communicating with outside parties can also be challenging, potentially leading to mistakes and difficulties in coordinating activities. Outside parties may have staffing difficulties, fail to comply with contractual obligations, experience regulatory compliance issues, undergo changes in priorities, become financially distressed or form relationships with other entities, some of which may be our competitors. We also face the risk of potential unauthorized disclosure or misappropriation of our intellectual property by CROs or

other third parties, which may reduce our trade secret protection and allow our potential competitors to access and exploit our proprietary technology. For any violations of laws and regulations during the conduct of our preclinical studies and future clinical trials, we could be subject to warning letters or enforcement action that may include civil penalties up to and including criminal prosecution.

For example, we will remain responsible for ensuring that each of our clinical trials is conducted in accordance with the general investigational plan and protocols for the trial. Moreover, the FDA requires us to comply with regulations, commonly referred to as GCPs for conducting, monitoring, recording and reporting the results of clinical trials to assure that data and reported results are credible and accurate and that the rights, integrity and confidentiality of trial participants are protected. If we, our collaborators, our CROs or other third parties fail to comply with applicable GCPs, the clinical data generated in our clinical trials may be deemed unreliable and FDA or comparable foreign regulatory authorities may require us to perform additional clinical trials before approving our marketing applications. We also are required to register certain ongoing clinical trials and post the results of such completed clinical trials on a government-sponsored database, ClinicalTrials.gov, within certain timeframes. Failure to do so can result in fines, adverse publicity and civil and criminal sanctions.

If our CROs or other third parties do not successfully carry out their contractual duties or obligations, fail to meet expected deadlines, or if the quality or accuracy of the clinical data they obtain is compromised due to the failure to adhere to our clinical protocols or regulatory requirements or for any other reasons, trials for product candidates may be extended, delayed or terminated, and we or our collaborators may not be able to obtain regulatory approval for, or successfully commercialize, any product candidate that we develop. If we are required to repeat, extend the duration of or increase the size of any trials we conduct, it could significantly delay commercialization and require significantly greater expenditures. As a result of any of these factors, our financial results and the commercial prospects for any product candidate that we or our collaborators may develop would be harmed, our costs could increase and our ability to generate revenues could be delayed.

We rely on third parties to supply raw materials or manufacture product supplies that are necessary for the conduct of preclinical studies, clinical trials and manufacturing of our product candidates, and failure by third parties to provide us with sufficient quantities of products, or to do so at acceptable quality levels or prices and on a timely basis, could harm our business.

We are dependent on third parties for the supply of various biological materials, such as cells, cytokines and antibodies, and the manufacture of product supplies, such as media, plasmids, mRNA and AAV viral vectors, that are necessary to produce our product candidates. The supply of these materials could be reduced or interrupted at any time. In such case, identifying and engaging an alternative supplier or manufacturer could result in delay, and we may not be able to find other acceptable suppliers or manufacturers on acceptable terms, or at all. Switching suppliers or manufacturers may involve substantial costs and is likely to result in a delay in our desired clinical and commercial timelines. If we change suppliers or manufacturers for commercial production, applicable regulatory agencies may require us to conduct additional studies or trials. If key suppliers or manufacturers are lost, or if the supply of the materials is diminished or discontinued, we or our collaborators may not be able to develop, manufacture and market product candidates in a timely and competitive manner, or at all. If any of our product candidates receives approval, we will likely need to seek alternative sources of supply of raw materials or manufactured product supplies and there can be no assurance that we will be able to establish such relationships to provide such supplies on commercially reasonable terms or at acceptable quality levels, if at all. If we are unable to identify and procure additional sources of supply that fit our required needs, we could face substantial delays or incur additional costs in procuring such materials. In addition, manufactured product supplies are subject to stringent manufacturing processes and rigorous testing. Delays in the completion and validation of facilities and manufacturing processes of these materials could adversely affect the ability to complete studies or trials and commercialize any product candidates that may receive approval. Furthermore, if our suppliers or manufacturers encounter challenges relating to employee turnover, the supply and manufacturing of our materials could be delayed or adversely affected as such parties seek to hire and train new employees. These factors could cause the delay of studies or trials, regulatory submissions, required approvals or commercialization of product candidates that we or our collaborators may develop, cause us to incur higher costs and prevent us from commercializing products successfully. Furthermore, if our suppliers or manufacturers fail to meet contractual requirements, and we are unable to secure one or more replacements capable of production at a substantially equivalent cost, our or our collaborators' studies or trials may be delayed and we could lose potential revenue.

We may continue to rely on third parties for at least a portion of the manufacturing process of product candidates, and failure by those parties to adequately perform their obligations could harm our business.

While we use our MCAT facility for certain of our clinical-scale manufacturing and processing needs, we may continue to rely on outside vendors for at least a portion of the manufacturing process of product candidates that we or our collaborators may develop. The facilities used by our contract manufacturers to manufacture product candidates must be approved by the FDA or other foreign regulatory agencies pursuant to inspections that will be conducted after we submit an application to the FDA or other foreign regulatory agencies. To the extent that we or our collaborators engage third parties for manufacturing services, we will not control the manufacturing process of, and will be completely dependent on, our contract manufacturing providers for compliance with cGMP

requirements for manufacture of the product candidates. We have not yet caused any product candidates to be manufactured or processed on a commercial scale and may not be able to do so. We will make changes as we work to optimize the manufacturing process, and we cannot be sure that even minor changes in the process will result in products that are safe and effective. If our contract manufacturers cannot successfully manufacture material that conforms to our specifications and the strict regulatory requirements of the FDA or other regulatory authorities, they will not be able to secure and/or maintain regulatory approval for their manufacturing facilities. In addition, we have no control over the ability of our contract manufacturers to maintain adequate quality control, quality assurance and qualified personnel. If the FDA or a comparable foreign regulatory authority does not approve these facilities for the manufacture of product candidates or if it withdraws any such approval in the future, we may need to find alternative manufacturing facilities, which would significantly impact our ability to develop, obtain regulatory approval for or market any of our or our collaborators' potential products.

Risks Related to Intellectual Property

Our ability to compete may decline if we do not adequately protect our proprietary rights, and if our proprietary rights do not provide a competitive advantage.

Our commercial success depends upon obtaining and maintaining proprietary rights to our intellectual property estate, including rights relating to ARCUS and to our product candidates, as well as successfully defending these rights against third-party challenges and successfully enforcing these rights to prevent third-party infringement. We will only be able to protect ARCUS and product candidates from unauthorized use by third parties to the extent that valid and enforceable patents cover them. Our ability to obtain and maintain patent protection for ARCUS and our product candidates is uncertain due to a number of factors, including that:

- we may not have been the first to invent the technology covered by our pending patent applications or issued patents;
- we may not be the first to file patent applications covering product candidates, including their compositions or methods of use, as patent applications in the United States and most other countries are confidential for a period of time after filing;
- our compositions and methods may not be patentable;
- our disclosures in patent applications may not be sufficient to meet the statutory requirements for patentability;
- any or all of our pending patent applications may not result in issued patents;
- others may independently develop identical, similar or alternative technologies, products or compositions or methods of use thereof;
- others may design around our patent claims to produce competitive technologies or products that fall outside of the scope of our patents;
- we may fail to identify patentable aspects of our research and development output before it is too late to obtain patent protection;
- we may not seek or obtain patent protection in countries that may eventually provide us a significant business opportunity;
- any patents issued to us may not provide a basis for commercially viable products, may not provide any competitive advantages or may be successfully challenged by third parties;
- others may identify prior art or other bases upon which to challenge and ultimately invalidate our patents or otherwise render them unenforceable; and
- the growing scientific and patent literature relating to engineered endonucleases, including our own patents and publications, may make it increasingly difficult or impossible to patent new engineered nucleases in the future.

Even if we have or obtain patents covering ARCUS or any product candidates or compositions, we and our collaborators may still be barred from making, using and selling such product candidates or technologies because of the patent rights of others. Others may have filed, and in the future may file, patent applications covering compositions, products or methods that are similar or identical to ours, which could materially affect our ability to successfully develop any product candidates or to successfully commercialize any approved products alone or with collaborators. In addition, because patent applications can take many years to issue, there may be currently pending applications unknown to us that may later result in issued patents that we or our collaborators may infringe. These patent applications may have priority over patent applications filed by us.

The issuance of a patent is not conclusive as to its inventorship, scope, validity or enforceability, and our owned and licensed patents may be challenged in the courts or patent offices in the United States and abroad. Such challenges may result in loss of exclusivity or freedom to operate or in patent claims being narrowed, invalidated or held unenforceable, in whole or in part, which could limit our ability to stop others from using or commercializing similar or identical technology and products, or limit the duration of the patent

protection of our technology and products. For example, in August 2019, the Patent Trial and Appeal Board (the "PTAB"), of the USPTO initiated two patent interferences, administrative proceedings within the USPTO, involving a family of patents that have been issued to us and a pending patent application filed by a third party. An interference is conducted by the PTAB when opposing parties have applied for patent claims to the same invention or substantially the same invention. The interference is conducted to determine which party, if either, is entitled to claims to the subject matter of the interference. In October 2020, we announced the PTAB has issued judgements in our favor in two patent interference proceedings that challenged nine U.S. patents we owned. The patents, which issued in 2018, relate to allogeneic CAR T cells produced by inserting a gene encoding a CAR into the TRAC locus, as well as methods of using those cells for cancer immunotherapy. In the interference proceedings, a third party argued that it had invented the technology in 2012. The PTAB, however, found that the third-party patent application did not satisfy the written description requirement and rejected these claims while maintaining the claims in all nine of our patents. Any adverse outcome in future interference proceedings could affect our competitive position, including, without limitation, loss of some or all of our involved patent claims, limiting our ability to stop others from using or commercializing similar or identical technology and products, which could harm our business, financial condition and results of operations. Protecting our patent rights in connection with such proceeding may also be expensive and may involve the diversion of significant management time.

Furthermore, we cannot guarantee that any patents will be issued from any pending or future owned or licensed patent applications. Thus, even if our patent applications issue as patents, they may not issue in a form that will provide us with meaningful protection, prevent competitors from competing with us or otherwise provide us with any competitive advantage. In addition, third parties may be able to develop products that are similar to, or better than, ours in a way that is not covered by the claims of our patents, or may have blocking patents that could prevent us from marketing our products or practicing our own patented technology. Moreover, patents have a limited lifespan. In the United States, the natural expiration of a patent is generally 20 years after it is filed. Various extensions may be available; however the life of a patent, and the protection it affords, is limited. Without patent protection for current or future product candidates, we may be open to competition from generic versions of such potential products. Given the amount of time required for the development, testing and regulatory review of new product candidates, patents protecting such candidates might expire before or shortly after such candidates are commercialized. As a result, our owned and licensed patent portfolio may not provide us with sufficient rights to exclude others from commercializing products similar or identical to those we or our collaborators may develop.

Obtaining and maintaining a patent portfolio entails significant expense, including periodic maintenance fees, renewal fees, annuity fees and various other governmental fees on patents and patent applications. These expenditures can be at numerous stages of prosecuting patent applications and over the lifetime of maintaining and enforcing issued patents. We may or may not choose to pursue or maintain protection for particular intellectual property in our portfolio. If we choose to forgo patent protection or to allow a patent application or patent to lapse purposefully or inadvertently, our competitive position could suffer. There are situations, however, in which failure to make certain payments or noncompliance with certain requirements in the patent process can result in abandonment or lapse of a patent or patent application, resulting in partial or complete loss of patent rights in the relevant jurisdiction. In such an event, our competitors might be able to enter the market, which would have a material adverse effect on our business.

Legal action that may be required to enforce our patent rights can be expensive and may involve the diversion of significant management time. There can be no assurance that we will have sufficient financial or other resources to file and pursue infringement claims, which typically last for years before they are concluded. In addition, these legal actions could be unsuccessful and result in the invalidation of our patents, a finding that they are unenforceable or a requirement that we enter into a licensing agreement with or pay monies to a third party for use of technology covered by our patents. We may or may not choose to pursue litigation or other actions against those that have infringed on our patents, or have used them without authorization, due to the associated expense and time commitment of monitoring these activities. If we fail to successfully protect or enforce our intellectual property rights, our competitive position could suffer, which could harm our results of operations.

Many biotechnology companies and academic institutions are currently pursuing a variety of different nuclease systems for genome editing technologies using zinc finger nucleases, TALENs, and CRISPR/Cas9 and the use of those nucleases in cancer immunotherapy, gene therapy and genome editing. Although those nucleases are physically and chemically different from our ARCUS nucleases, those companies and institutions may seek patents that broadly cover aspects of cancer immunotherapy, gene therapy and genome editing using nucleases generally. Such patents, if issued, valid and enforceable, could prevent us from marketing our product candidates, if approved, practicing our own patented technology, or might require us to take a license which might not be available on commercially reasonable terms or at all. While we expect that we will continue to be able to patent our ARCUS nucleases for the foreseeable future, as the scientific and patent literature relating to engineered endonucleases increases, including our own patents and publications, it may become more difficult or impossible to patent new engineered endonucleases in the future.

If we fail to comply with our obligations in the agreements under which we license intellectual property rights from third parties or otherwise experience disruptions to our business relationships with our licensors, we could lose license rights that are important to our business.

We are a party to a number of intellectual property license agreements that are important to our business and expect to enter into additional license agreements in the future. Our existing license agreements impose, and we expect that future license agreements will impose, various diligence, milestone payment, royalty and other obligations on us. We may need to outsource and rely on third parties for many aspects of the development, sales and marketing of any products covered under our current and future license agreements. Delay or failure by these third parties could adversely affect the continuation of our license agreements with our licensors. If we fail to comply with any of our obligations under these agreements, or we are subject to a bankruptcy, our licensors may have the right to terminate the license, in which event we would not be able to market any products covered by the license.

In addition, disputes may arise regarding the payment of the royalties due to licensors in connection with our exploitation of the rights we license from them. Licensors may contest the basis of royalties we retained and claim that we are obligated to make payments under a broader basis. In addition to the costs of any litigation we may face as a result, any legal action against us could increase our payment obligations under the respective agreement and require us to pay interest and potentially damages to such licensors.

In some cases, patent prosecution of our licensed technology is controlled solely by the licensor. If such licensor fails to obtain and maintain patent or other protection for the proprietary intellectual property we license from such licensor, we could lose our rights to such intellectual property or the exclusivity of such rights, and our competitors could market competing products using such intellectual property. In that event, we may be required to expend significant time and resources to develop or license replacement technology. If we are unable to do so, we or our collaborators may be unable to develop or commercialize the affected product candidates, which could harm our business significantly. In other cases, we control the prosecution of patents resulting from licensed technology. In the event we breach any of our obligations related to such prosecution, we may incur significant liability to our licensing partners.

For example, our license agreement with Duke, which we refer to as the Duke License, imposes various payment, royalty and other obligations on us in order to maintain the license. If we fail to make royalty payments or milestone payments required under the Duke License, Duke may terminate the agreement. If we or our affiliates obtain a license from a third party to practice the Duke technology, we must use commercially reasonable efforts to secure a covenant not to sue Duke, or any of its faculty, students, employees or agents, for any research and development efforts conducted at Duke that resulted in the creation of any of its inventions or intellectual property rights arising therefrom. Additionally, because development of the Duke technology was funded in part by the U.S. government, it is subject to certain government rights and obligations, including the requirement that any products sold in the United States based upon such technology be substantially manufactured in the United States.

In addition, our cross-license agreement with Cellectis, or the Cellectis License, imposes various obligations on us in order to maintain the license. In particular, if we participate in or provide assistance to a third party challenging the validity, enforceability and/or patentability of any claim of any patent licensed to us by Cellectis under this agreement, Cellectis may terminate the agreement. The Cellectis License does not provide exclusive rights to use the licensed intellectual property and technology or rights in all relevant fields in which we may wish to develop or commercialize our technology and products in the future. As a result, we are not able to prevent competitors from developing and commercializing competitive products and technology that may use this technology. Additionally, we do not have the right to control the preparation, filing, prosecution, maintenance, enforcement and defense of patents and patent applications covering the technology that we license from Cellectis. Therefore, we cannot be certain that these patents and patent applications will be prepared, filed, prosecuted, maintained and defended in a manner consistent with the best interests of our business. If Cellectis or other licensors fail to prosecute, maintain, enforce and defend the patents subject to such licenses, or lose rights to those patents or patent applications, the rights we have licensed may be reduced or eliminated, and our right to develop and commercialize any of our products that are the subject of such licensed rights could be adversely affected.

If we fail to comply with our obligations under the Duke License or the Cellectis License, or arrangements with any other licensors, our counterparties may have the right to terminate these agreements, in which event we might not be able to develop, manufacture or market any product candidate that is covered by these agreements, which could materially adversely affect the value of any such product candidate. Termination of these agreements or reduction or elimination of our rights under these agreements may result in our having to negotiate new or reinstated agreements with less favorable terms, or cause us to lose our rights under these agreements, including our rights to important intellectual property or technology.

Disputes may arise regarding intellectual property subject to a license agreement, including:

- the scope of rights granted under the license agreement and other interpretation-related issues;
- the amounts of royalties, milestones or other payments due to our licensors;

- the extent to which our technology and processes infringe on intellectual property of the licensor that is not subject to the license agreement;
- the sublicensing of patent and other rights under our collaborative development relationships;
- our diligence obligations under the license agreement and what activities satisfy those diligence obligations;
- the ownership of inventions and know-how resulting from the joint creation or use of intellectual property by our licensors and us and our collaborators; and
- the priority of invention of patented technology.

Such disputes may be costly to resolve and may divert management's attention away from day-to-day activities. If disputes over intellectual property that we have licensed from third parties prevent or impair our ability to maintain our licensing arrangements on acceptable terms, we or our collaborators may be unable to successfully develop and commercialize the affected product candidates.

Some of our in-licensed intellectual property has been discovered through government funded research and thus may be subject to federal regulations such as "march-in" rights, certain reporting requirements and a preference for U.S.-based companies, and compliance with such regulations may limit our exclusive rights and our ability to contract with foreign manufacturers.

Certain intellectual property rights that have been in-licensed pursuant to the Duke License have been generated through the use of U.S. government funding and are therefore subject to certain federal regulations. As a result, the U.S. government may have certain rights to intellectual property embodied in our current or future product candidates pursuant to the Bayh-Dole Act of 1980, or the Patent and Trademark Law Amendment. These U.S. government rights include a non-exclusive, non-transferable, irrevocable worldwide license to use inventions for any governmental purpose. In addition, the U.S. government has the right, under certain limited circumstances, to require the licensor to grant exclusive, partially exclusive or non-exclusive licenses to any of these inventions to a third party if it determines that (1) adequate steps have not been taken to commercialize the invention, (2) government action is necessary to meet public health or safety needs or (3) government action is necessary to meet requirements for public use under federal regulations (also referred to as "march-in rights"). The U.S. government also has the right to take title to these inventions if the licensor fails to disclose the invention to the government or fails to file an application to register the intellectual property within specified time limits. Intellectual property generated under a government funded program is also subject to certain reporting requirements, compliance with which may require us to expend substantial resources. In addition, the U.S. government requires that any products embodying any of these inventions or produced through the use of any of these inventions be manufactured substantially in the United States, and the Duke License requires that we comply with this requirement. This preference for U.S. industry may be waived by the federal agency that provided the funding if the owner or assignee of the intellectual property can show that reasonable but unsuccessful efforts have been made to grant licenses on similar terms to potential licensees that would be likely to manufacture the products substantially in the United States or that under the circumstances domestic manufacture is not commercially feasible. This preference for U.S. industry may limit our ability to contract with foreign product manufacturers for products covered by such intellectual property. To the extent any of our owned or licensed future intellectual property is also generated through the use of U.S. government funding, the provisions of the Bayh-Dole Act may similarly apply.

If we do not obtain patent term extension in the United States under the Hatch-Waxman Act and in foreign countries under similar legislation with respect to our product candidates, thereby potentially extending the term of marketing exclusivity for such product candidates, our business may be harmed.

In the United States, a patent that covers an FDA-approved drug or biologic may be eligible for a term extension designed to restore the period of the patent term that is lost during the premarket regulatory review process conducted by the FDA. Depending upon the timing, duration and conditions of FDA marketing approval of our product candidates, one or more of our U.S. patents may be eligible for limited patent term extension under the Drug Price Competition and Patent Term Restoration Act of 1984, or the Hatch-Waxman Act, which permits a patent term extension of up to five years for a patent covering an approved product as compensation for effective patent term lost during product development and the FDA regulatory review process. In the EU, our product candidates may be eligible for term extensions based on similar legislation. In either jurisdiction, however, we may not receive an extension if we fail to apply within applicable deadlines, fail to apply prior to expiration of relevant patents or otherwise fail to satisfy applicable requirements. Even if we are granted such extension, the duration of such extension may be less than our request. If we are unable to obtain a patent term extension, or if the term of any such extension is less than our request, the period during which we can enforce our patent rights for that product will be in effect shortened and our competitors may obtain approval to market competing products sooner. The resulting reduction of years of revenue from applicable products could be substantial.

Patents and patent applications involve highly complex legal and factual questions, which, if determined adversely to us, could negatively impact our patent position.

The patent positions of biopharmaceutical and biotechnology companies and other actors in our fields of business can be highly uncertain and typically involve complex scientific, legal and factual analyses. In particular, the interpretation and breadth of claims allowed in some patents covering biopharmaceutical compositions may be uncertain and difficult to determine, and are often affected materially by the facts and circumstances that pertain to the patented compositions and the related patent claims. The standards of the USPTO and its foreign counterparts are sometimes uncertain and could change in the future. Consequently, the issuance and scope of patents cannot be predicted with certainty. Patents, if issued, may be challenged, invalidated or circumvented. U.S. patents and patent applications may also be subject to interference or derivation proceedings, and U.S. patents may be subject to reexamination proceedings, post-grant review and/or *inter partes* review in the USPTO. International patents may also be subject to opposition or comparable proceedings in the corresponding international patent office, which could result in either loss of the patent or denial of the patent application or loss or reduction in the scope of one or more of the claims of the patent or patent application. In addition, such interference, derivation, reexamination, post-grant review, *inter partes* review and opposition proceedings may be costly. Accordingly, rights under any issued patents may not provide us with sufficient protection against competitive products or processes.

Furthermore, even if not challenged, our patents and patent applications may not adequately protect our technology and any product candidates or products that we develop alone or with collaborators or prevent others from designing their products to avoid being covered by our claims. If the breadth or strength of protection provided by the patent applications we hold with respect to product candidates or potential products is threatened, it could dissuade companies from collaborating with us to develop, and could threaten our or their ability to successfully commercialize, such product candidates. Furthermore, for U.S. applications in which any claim is entitled to a priority date before March 16, 2013, an interference proceeding can be provoked by a third party or instituted by the USPTO in order to determine who was the first to invent any of the subject matter covered by such patent claims.

In addition, changes in, or different interpretations of, patent laws in the United States and other countries may permit others to use our discoveries or to develop and commercialize our technology and product candidates or products without providing any compensation to us, or may limit the scope of patent protection that we are able to obtain. The laws of some countries do not protect intellectual property rights to the same extent as U.S. laws, and those countries may lack adequate rules and procedures for defending our intellectual property rights.

If the patent applications we hold or have in-licensed with respect to our current and future research and development programs and product candidates fail to issue, if their validity, breadth or strength of protection is threatened, or if they fail to provide meaningful exclusivity for our technology or any products and product candidates that we or our collaborators may develop, it could dissuade companies from collaborating with us to develop product candidates, encourage competitors to develop competing products or technologies and threaten our or our collaborators' ability to commercialize future product candidates. Any such outcome could have a material adverse effect on our business.

Third parties may assert claims against us alleging infringement of their patents and proprietary rights, or we may need to become involved in lawsuits to defend or enforce our patents, either of which could result in substantial costs or loss of productivity, delay or prevent the development and commercialization of product candidates, prohibit our use of proprietary technology or sale of potential products or put our patents and other proprietary rights at risk.

Our commercial success depends in part upon our ability to develop, manufacture, market and sell product candidates without alleged or actual infringement, misappropriation or other violation of the patents and proprietary rights of third parties. Litigation relating to infringement or misappropriation of patent and other intellectual property rights in the pharmaceutical and biotechnology industries is common, including patent infringement lawsuits, interferences, oppositions and reexamination proceedings before the USPTO and corresponding international patent offices. The various markets in which we plan to operate are subject to frequent and extensive litigation regarding patents and other intellectual property rights. In addition, many companies in intellectual property-dependent industries, including the biotechnology and pharmaceutical industries, have employed intellectual property litigation as a means to gain an advantage over their competitors. Numerous United States, EU and other internationally issued patents and pending patent applications, which are owned by third parties, exist in the fields in which we and our collaborators are developing product candidates, and as the biotechnology and pharmaceutical industries expand and more patents are issued, the risk increases that our product candidates may be subject to claims of infringement of the intellectual property rights of third parties. For example, we are aware of certain patents held by third parties relating to the modification of T cells, including the production of CAR T cells. Although conducting clinical trials and other development activities with respect to our CAR T product candidates is not considered an act of infringement in the United States, if and when any of our CAR T product candidates may be approved by the FDA, those third parties may seek to enforce their patents by filing a patent infringement lawsuit against us. As a result of any patent infringement claims, or in order to avoid any potential infringement claims, we may choose to seek, or be required to seek, a license from the third party, which may require payment of substantial royalties or fees, or require us to grant a cross-license under our intellectual property rights, similar to the cross license we granted Cellectis as part of our patent litigation settlement. These licenses may not be available on reasonable

terms or at all. Even if a license can be obtained on reasonable terms, the rights may be nonexclusive, which would give our competitors access to the same intellectual property rights. If we are unable to enter into a license on acceptable terms, we or our collaborators could be prevented from commercializing one or more product candidates, or forced to modify such product candidates, or to cease some aspect of our business operations, which could harm our business significantly. We or our collaborators might also be forced to redesign or modify our technology or product candidates so that we no longer infringe the third-party intellectual property rights, which may result in significant cost or delay to us, or which redesign or modification could be impossible or technically infeasible. Even if we were ultimately to prevail, any of these events could require us to divert substantial financial and management resources that we would otherwise be able to devote to our business.

Further, if a patent infringement suit is brought against us, our collaborators or our third-party service providers, our development, manufacturing or sales activities relating to the product or product candidate that is the subject of the suit may be delayed or terminated. In addition, defending such claims has in the past and may in the future cause us to incur substantial expenses and, if successful, could cause us to pay substantial damages if we are found to be infringing a third party's patent rights. These damages potentially include increased damages and attorneys' fees if we are found to have infringed such rights willfully. Some claimants may have substantially greater resources than we do and may be able to sustain the costs of complex intellectual property litigation to a greater degree and for longer periods of time than we could. In addition, patent holding companies that focus solely on extracting royalties and settlements by enforcing patent rights may target us. In addition, if the breadth or strength of protection provided by the patents and patent applications we own or in-license is threatened, it could dissuade companies from collaborating with us to license, develop or commercialize current or future product candidates.

We have been and may in the future be subject to third-party claims and similar adversarial proceedings or litigation in other jurisdictions regarding our infringement of the patent rights of third parties. Even if such claims are without merit, a court of competent jurisdiction could hold that these third-party patents are valid, enforceable and infringed, and the holders of any such patents may be able to block or our collaborators' ability to further develop or commercialize the applicable product candidate unless we obtain a license under the applicable patents, or until such patents expire or are finally determined to be invalid or unenforceable. Similarly, if any third-party patents were held by a court of competent jurisdiction to cover aspects of our technologies, compositions, formulations, or methods of treatment, prevention or use, the holders of any such patents may be able to prohibit our use of those technologies, compositions, formulations, methods of treatment, prevention or use or other technologies, effectively blocking our or our collaborators' ability to develop and commercialize the applicable product candidate until such patent expires or is finally determined to be invalid or unenforceable or unless we or our collaborators obtain a license.

Some of our competitors may be able to sustain the costs of complex intellectual property litigation more effectively than we can because they have substantially greater resources. In addition, intellectual property litigation, regardless of its outcome, may cause negative publicity, adversely impact prospective customers, cause product shipment delays or prohibit us from manufacturing, marketing or otherwise commercializing our products, services and technology. Any uncertainties resulting from the initiation and continuation of any litigation could have a material adverse effect on our ability to raise additional funds or otherwise have a material adverse effect on our business, results of operation, financial condition or cash flows.

If we or one of our licensors were to initiate legal proceedings against a third party to enforce a patent covering our technology or a product candidate, the defendant could counterclaim that our patent is invalid or unenforceable. In patent litigation in the United States and Europe, defendant counterclaims alleging invalidity or unenforceability are common. Grounds for a validity challenge could be an alleged failure to meet any of several statutory requirements, for example, lack of novelty, obviousness or non-enablement. Third parties might allege unenforceability of our patents because during prosecution of the patent an individual connected with such prosecution withheld relevant information, or made a misleading statement. The outcome of proceedings involving assertions of invalidity and unenforceability during patent litigation is unpredictable. With respect to the validity of patents, for example, we cannot be certain that there is no invalidating prior art of which we and the patent examiner were unaware during prosecution, but that an adverse third party may identify and submit in support of such assertions of invalidity. If a defendant were to prevail on a legal assertion of invalidity or unenforceability, we would lose at least part, and perhaps all, of the patent protection on our technology or product candidates. Our patents and other intellectual property rights also will not protect our technology if competitors design around our protected technology without infringing our patents or other intellectual property rights. Even if resolved in our favor, litigation or other legal proceedings relating to intellectual property claims may cause us to incur significant expenses and could distract our technical and management personnel from their normal responsibilities. In addition, because of the substantial amount of discovery required in connection with intellectual property litigation, there is a risk that some of our confidential information could be compromised by disclosure during this type of litigation. There could also be public announcements of the results of hearings, motions or other interim proceedings or developments, and if securities analysts or investors view these announcements in a negative light, the price of our common stock could be adversely affected. Such litigation or proceedings could substantially increase our operating losses and reduce our resources available for development activities. We may not have sufficient financial or other resources to adequately conduct such litigation or proceedings.

Developments in patent law could have a negative impact on our business.

From time to time, the Supreme Court, other federal courts, the United States Congress, or Congress, the USPTO and similar international authorities may change the standards of patentability, and any such changes could have a negative impact on our business. For example, the America Invents Act (the "AIA"), which was passed in September 2011, resulted in significant changes to the U.S. patent system. An important change introduced by the AIA is that, as of March 16, 2013, the United States transitioned from a "first-to-invent" to a "first-to-file" system for deciding which party should be granted a patent when two or more patent applications are filed by different parties claiming the same invention. Under a "first-to-file" system, assuming the other requirements for patentability are met, the first inventor to file a patent application generally will be entitled to a patent on the invention regardless of whether another inventor had made the invention earlier. A third party that files a patent application in the USPTO after that date but before us could therefore be awarded a patent covering an invention of ours even if we made the invention before it was made by the third party. Circumstances could prevent us from promptly filing patent applications on our inventions.

The AIA limited where a patentee may file a patent infringement suit and provided opportunities for third parties to challenge any issued patent in the USPTO. Those provisions apply to all of our U.S. patents, regardless of when issued. Because of a lower evidentiary standard in USPTO proceedings compared to the evidentiary standard in U.S. federal courts necessary to invalidate a patent claim, a third party could potentially provide evidence in a USPTO proceeding sufficient for the USPTO to hold a claim invalid even though the same evidence would be insufficient to invalidate the claim if first presented in a district court action. Accordingly, a third party may attempt to use the USPTO procedures to invalidate our patent claims that would not have been invalidated if first challenged by the third party as a defendant in a district court action. These provisions could increase the uncertainties and costs surrounding the prosecution of our or our licensors' patent applications and the enforcement or defense of our or our licensors' issued patents.

Additionally, the Supreme Court has ruled on several patent cases in recent years either narrowing the scope of patent protection available in certain circumstances or weakening the rights of patent owners in certain situations, and there are other open questions under patent law that courts have yet to decisively address. In addition to increasing uncertainty with regard to our ability to obtain patents in the future, this combination of events has created uncertainty with respect to the value of our patents and patent applications. Depending on decisions by Congress, the federal courts and the USPTO, the laws and regulations governing patents could change in unpredictable ways and could weaken our ability to obtain new patents or to enforce our existing patents and patents that we might obtain in the future. In addition, the European patent system is relatively stringent in the type of amendments that are allowed during prosecution, but the complexity and uncertainty of European patent laws has also increased in recent years. Complying with these laws and regulations could limit our ability to obtain new patents in the future that may be important for our business.

If we were unable to protect the confidentiality of our trade secrets and enforce our intellectual property assignment agreements, our business and competitive position would be harmed.

In addition to patent protection, because we operate in the highly technical field of development of product candidates and products using genome editing, we rely significantly on trade secret protection in order to protect our proprietary technology and processes. Trade secrets are difficult to protect. Our policy is to enter into confidentiality and intellectual property assignment agreements with our employees, consultants, outside scientific collaborators, sponsored researchers and other advisors. These agreements generally require that the other party keep confidential and not disclose to third parties all confidential information developed by the party or made known to the party by us during the course of the party's relationship with us. These agreements also generally provide that inventions conceived by the party in the course of rendering services to us will be our exclusive property. However, we may be unsuccessful in executing such an agreement with each party who in fact conceives or develops intellectual property that we regard as our own. Our assignment agreements may not be self-executing or may be breached, and we may be forced to bring claims against third parties, or defend claims they may bring against us, to determine the ownership of what we regard as our intellectual property. In addition, these agreements may be held unenforceable and may not effectively assign intellectual property rights to us. If our trade secrets and other unpatented or unregistered proprietary information are disclosed, we are likely to lose such trade secret protection.

In addition, certain provisions in our intellectual property agreements may be susceptible to multiple interpretations. The resolution of any contract interpretation disagreement that may arise could affect the scope of our rights to the relevant intellectual property or technology, or affect financial or other obligations under the relevant agreement, either of which could have a material adverse effect on our business, financial condition, results of operations and prospects.

In addition, agreements with third parties typically restrict the ability of such third parties to publish data potentially relating to our trade secrets. Our academic collaborators typically have rights to publish data, provided that we are notified in advance and may delay publication for a specified period of time in order to secure our intellectual property rights arising from the arrangement. In other cases, publication rights are controlled exclusively by us, although in some cases we may share these rights with other parties. We also conduct joint research and product development activities that may require us to share trade secrets under the terms of our research and development collaborations or similar agreements. In addition to contractual measures, we try to protect the confidential nature of

our proprietary information using physical and technological security measures. Such measures may not provide adequate protection for our proprietary information. For example, our security measures may not prevent an employee or consultant with authorized access from misappropriating our trade secrets and providing them to a competitor, and the recourse we have available against such misconduct may not provide an adequate remedy to protect our interests fully. Enforcing a claim that a party illegally disclosed or misappropriated a trade secret can be difficult, expensive and time consuming, and the outcome is unpredictable. In addition, courts outside the United States may be less willing to protect trade secrets. Furthermore, our proprietary information may be independently developed by others in a manner that could prevent legal recourse by us. Competitors could purchase any products we may develop and commercialize and attempt to reverse engineer and replicate some or all of the competitive advantages we derive from our development efforts, willfully infringe our intellectual property rights or design around our protected technology. In addition, our key employees, consultants, suppliers or other individuals with access to our proprietary technology and know-how may incorporate that technology and know-how into projects and inventions developed independently or with third parties. As a result, disputes may arise regarding the ownership of the proprietary rights to such technology or know-how, and any such dispute may not be resolved in our favor. If any of our confidential or proprietary information, including our trade secrets, were to be disclosed or misappropriated, or if any such information was independently developed by a competitor, our competitive position could be harmed and such disclosure or misappropriation could have a material adverse effect on our business.

We will not seek to protect our intellectual property rights in all jurisdictions throughout the world, and we may not be able to adequately enforce our intellectual property rights even in the jurisdictions where we seek protection.

Filing, prosecuting and defending patents on product candidates in all countries and jurisdictions throughout the world would be prohibitively expensive, and our intellectual property rights in some countries outside the United States could be less extensive than those in the United States, assuming that rights are obtained in the United States. In-licensing patents covering product candidates in all countries throughout the world may similarly be prohibitively expensive, if such opportunities are available at all. In addition, the laws of some foreign countries do not protect intellectual property rights to the same extent as federal and state laws in the United States. Consequently, we may not be able to prevent third parties from practicing our inventions in all countries outside the United States, or from selling or importing products made using our inventions in and into the United States or other jurisdictions.

We generally apply for patents in those countries where we intend to make, have made, use, offer for sale or sell products and where we assess the risk of infringement to justify the cost of seeking patent protection. However, we do not seek protection in all countries where we sell products and we may not accurately predict all the countries where patent protection would ultimately be desirable. If we fail to timely file a patent application in any such country or major market, we may be precluded from doing so at a later date. Competitors may use our technologies in jurisdictions where we do not pursue and obtain patent protection to develop their own products and may export otherwise infringing products to territories where we have patent protection, but where our ability to enforce our patent rights is not as strong as in the United States. These products may compete with any products that we or our collaborators may develop, and our patents or other intellectual property rights may not be effective or sufficient to prevent such competition.

The laws of some other countries do not protect intellectual property rights to the same extent as the laws of the United States. For example, European patent law restricts the patentability of methods of treatment of the human body more than U.S. law does. Patent protection must ultimately be sought on a country-by-country basis, which is an expensive and time-consuming process with uncertain outcomes. Accordingly, we may choose not to seek patent protection in certain countries, and we will not have the benefit of patent protection in such countries. In addition, the legal systems of some countries, particularly developing countries, do not favor the enforcement of patents and other intellectual property protection, especially those relating to biopharmaceuticals or biotechnologies. As a result, many companies have encountered significant difficulties in protecting and defending intellectual property rights in certain jurisdictions outside the United States. Such issues may make it difficult for us to stop the infringement of our patents, if obtained, or the misappropriation of our other intellectual property rights. For example, many other countries, including countries in the EU, have compulsory licensing laws under which a patent owner must grant licenses to third parties. In addition, many countries limit the enforceability of patents against third parties, including government agencies or government contractors. In these countries, patents may provide limited or no benefit. In those countries, we and our licensors may have limited remedies if patents are infringed or if we or our licensors are compelled to grant a license to a third party, which could materially diminish the value of those patents and could limit our potential revenue opportunities. Accordingly, our and our licensors' efforts to enforce intellectual property rights around the world may be inadequate to obtain a significant commercial advantage from the intellectual property that we own or license.

Furthermore, proceedings to enforce our patent rights in foreign jurisdictions could result in substantial costs and divert our efforts and attention from other aspects of our business, subject our patents to the risk of being invalidated or interpreted narrowly, subject our patent applications to the risk of not issuing or provoke third parties to assert claims against us. We may not prevail in any lawsuits that we initiate, and the damages or other remedies awarded to us, if any, may not be commercially meaningful, while the damages and other remedies we may be ordered to pay such third parties may be significant. Accordingly, our efforts to enforce our intellectual property rights around the world may be inadequate to obtain a significant commercial advantage from the intellectual property that we develop or license.

We may not be successful in obtaining or maintaining necessary rights to product components and processes for our development pipeline through acquisitions and in-licenses.

We have rights, through licenses from third parties and under patents that we own, to the intellectual property to develop the product candidates we are currently developing alone or with collaborators. Because our programs may involve additional product candidates that may require the use of proprietary rights held by third parties, the growth of our business may depend in part on our ability to acquire, in-license or use these proprietary rights. In addition, product candidates may require specific formulations to work effectively and efficiently, and these rights may be held by others. We may be unable to acquire or in-license any compositions, methods of use, processes or other third-party intellectual property rights from third parties that we identify. The licensing and acquisition of third-party intellectual property rights is a competitive area, and a number of more established companies, or companies that have greater resources than we do, may also be pursuing strategies to license or acquire third-party intellectual property rights that we may consider necessary or attractive to develop or commercialize product candidates. These established companies may have a competitive advantage over us due to their size and greater cash resources and clinical development and commercialization capabilities. We may not be able to successfully complete such negotiations and ultimately acquire the rights to the intellectual property surrounding product candidates that we may seek to acquire.

For example, we sometimes collaborate with academic institutions to accelerate our preclinical research or development under written agreements with these institutions. Typically, these institutions provide us with an option to negotiate a license to any of the institution's rights in technology resulting from the strategic alliance. Regardless of such right of first negotiation, we may be unable to negotiate a license within the specified time frame or under terms that are acceptable to us, and the institution may license such intellectual property rights to third parties, potentially blocking our ability to pursue our development and commercialization plans.

In addition, companies that perceive us to be a competitor may be unwilling to assign or license to us intellectual property rights that we require in order to successfully develop and commercialize potential products. We also may be unable to obtain such a license or assignment on terms that would allow us to make an appropriate return on our investment. In either event, our business and prospects for growth could suffer.

If our trademarks and trade names are not adequately protected, then we may not be able to build name recognition in our markets of interest and our business may be adversely affected.

If our trademarks and trade names are not adequately protected, then we may not be able to build name recognition in our markets of interest and our business may be adversely affected. We may not be able to protect our rights to our trademarks and trade names, which we need to build name recognition among potential collaborators or customers in our markets of interest. At times, competitors may adopt trade names or trademarks similar to ours, thereby impeding our ability to build brand identity and possibly leading to market confusion. In addition, there could be potential trade name or trademark infringement claims brought by owners of other registered trademarks or trademarks that incorporate variations of our unregistered trademarks or trade names. Over the long term, if we are unable to successfully register our trademarks and trade names and establish name recognition based on our trademarks and trade names, then we may not be able to compete effectively and our business may be adversely affected. Our efforts to enforce or protect our proprietary rights related to trademarks, trade secrets, domain names, copyrights and other intellectual property may be ineffective and could result in substantial costs and diversion of resources and could adversely impact our financial condition or results of operations.

Risks Related to Owning Our Common Stock

We could be subject to securities class action litigation.

In the past, securities class action litigation has often been brought against a company following a decline in the market price of its securities. This risk is especially relevant to us as a clinical-stage biopharmaceutical company, as our stock price can significantly fluctuate as a result of public announcements regarding the progress of our development efforts for our discovery platform and our product candidates. If we face such litigation, it could result in substantial costs and a diversion of management's attention and resources, which could harm our business.

We do not currently intend to pay dividends on our common stock.

We do not intend to pay any dividends to holders of our common stock for the foreseeable future. We currently intend to invest our future earnings, if any, to fund our growth. In addition, pursuant to the terms of our Revolving Line we are prohibited from paying cash dividends without the prior written consent of PWB and future debt instruments may materially restrict our ability to pay dividends on our common stock. Therefore, you are not likely to receive any dividends on your common stock for the foreseeable future, and the success of an investment in our common stock will depend upon any future appreciation in its value. Consequently,

you may need to sell all or part of your common stock after price appreciation, which may never occur, as the only way to realize any future gains on your investment.

Provisions in our amended and restated certificate of incorporation and restated bylaws or Delaware law might discourage, delay or prevent a change in control of our company or changes in our management and therefore depress the trading price of our common stock.

Provisions in our amended and restated certificate of incorporation and our restated bylaws may discourage, delay or prevent a merger, acquisition or other change in control of our company that stockholders may consider favorable, including transactions in which you might otherwise receive a premium for your shares. These provisions could also limit the price that investors might be willing to pay in the future for shares of our common stock, thereby depressing the market price of our common stock. In addition, because our board of directors is responsible for appointing the members of our management team, these provisions may frustrate or prevent any attempts by our stockholders to replace or remove our current management by making it more difficult for stockholders to replace members of our board of directors. Among other things, these provisions include those establishing:

- a classified board of directors with three-year staggered terms, which may delay the ability of stockholders to change the membership of a majority of our board of directors;
- no cumulative voting in the election of directors, which limits the ability of minority stockholders to elect director candidates;
- the exclusive right of our board of directors to elect a director to fill a vacancy created by the expansion of the board of directors or the resignation, death or removal of a director, which prevents stockholders from filling vacancies on our board of directors;
- the ability of our board of directors to authorize the issuance of shares of preferred stock and to determine the terms of those shares, including preferences and voting rights, without stockholder approval, which could be used to significantly dilute the ownership of a hostile acquirer;
- the ability of our board of directors to alter our bylaws without obtaining stockholder approval;
- the required approval of the holders of at least two-thirds of the shares entitled to vote at an election of directors to adopt, amend or repeal our bylaws or repeal the provisions of our amended and restated certificate of incorporation regarding the election and removal of directors;
- a prohibition on stockholder action by written consent, which forces stockholder action to be taken at an annual or special meeting of our stockholders;
- the requirement that a special meeting of stockholders may be called only by the chairman of the board of directors, our chief executive officer (or our president, in the absence of a chief executive officer) or a majority of our board of directors, which may delay the ability of our stockholders to force consideration of a proposal or to take action, including the removal of directors; and
- advance notice procedures that stockholders must comply with in order to nominate candidates to our board of directors or to propose matters to be acted upon at a stockholders' meeting, which may discourage or deter a potential acquirer from conducting a solicitation of proxies to elect the acquirer's own slate of directors or otherwise attempting to obtain control of us.

Moreover, because we are incorporated in Delaware, we are governed by the provisions of Section 203 of the General Corporation Law of the State of Delaware, which prohibits a person who owns in excess of 15% of our outstanding voting stock from merging or combining with us for a period of three years after the date of the transaction in which the person acquired in excess of 15% of our outstanding voting stock, unless the merger or combination is approved in a prescribed manner.

Our amended and restated certificate of incorporation and our amended and restated bylaws include exclusive forum provisions for substantially all disputes between us and our stockholders, which could limit our stockholders' ability to obtain a favorable judicial forum for disputes with us or our directors, officers or employees.

Our amended and restated certificate of incorporation provides that, unless we consent in writing to the selection of an alternative forum to the fullest extent permitted by law, the Court of Chancery of the State of Delaware will be the sole and exclusive forum for (1) any derivative action or proceeding brought on our behalf, (2) any action asserting a claim for breach of a fiduciary duty owed by any of our directors, officers or other employees to us or our stockholders, (3) any action asserting a claim arising pursuant to any provision of the General Corporation Law of the State of Delaware, our amended and restated certificate of incorporation or our amended and restated bylaws, or (4) any action asserting a claim governed by the internal affairs doctrine. Under our amended and restated certificate of incorporation, this exclusive forum provision will not apply to claims which are vested in the exclusive jurisdiction of a court or forum other than the Court of Chancery of the State of Delaware, or for which the Court of Chancery of the

State of Delaware does not have subject matter jurisdiction. For instance, the provision would not apply to actions arising under federal securities laws, including suits brought to enforce any liability or duty created by the Exchange Act or the rules and regulations thereunder. Further, our amended and restated bylaws provide that, unless we consent in writing to the selection of an alternative forum, to the fullest extent permitted by law, the federal district courts of the United States will be the exclusive forum for the resolution of any complaint asserting a cause of action arising under the Securities Act and that any person or entity purchasing or otherwise acquiring or holding any interest in shares of our capital stock are deemed to have notice of and consented to this provision. These exclusive forum provisions may limit a stockholder's ability to bring a claim in a judicial forum that it finds favorable for disputes with us or our directors, officers or other employees, which may discourage such lawsuits against us and our directors, officers and other employees. For example, stockholders who do bring a claim in the Court of Chancery could face additional litigation costs in pursuing any such claim, particularly if they do not reside in or near the State of Delaware. The Court of Chancery may also reach different judgments or results than would other courts, including courts where a stockholder considering an action may be located or would otherwise choose to bring the action, and such judgments or results may be more favorable to us than to our stockholders.

We are an "emerging growth company" and the reduced disclosure requirements applicable to emerging growth companies may make our common stock less attractive to investors.

We are an "emerging growth company," as defined in the JOBS Act. We will remain an emerging growth company until the earlier of (1) December 31, 2024, (2) the last day of the fiscal year in which we have total annual gross revenue of $1.07 billion or more, (3) the date on which we have issued more than $1.0 billion in nonconvertible debt during the previous three years, or (4) the date on which we are deemed to be a large accelerated filer under the rules of the SEC which means the market value of our common stock that is held by non-affiliates exceeds $700 million as of the prior June 30th. For so long as we remain an emerging growth company, we are permitted and intend to rely on exemptions from certain disclosure requirements that are applicable to other public companies that are not emerging growth companies. These exemptions include:

- being permitted to present only two years of "Management's Discussion and Analysis of Financial Condition and Results of Operations" disclosure in this Annual Report on Form 10-K;
- not being required to comply with the auditor attestation requirements of Section 404 of the Sarbanes-Oxley Act of 2002, as amended;
- not being required to comply with any requirement that may be adopted by the Public Company Accounting Oversight Board regarding mandatory audit firm rotation or a supplement to the auditor's report providing additional information about the audit and the financial statements;
- reduced disclosure obligations in our SEC filings regarding executive compensation; and
- exemptions from the requirements of holding a nonbinding advisory vote on executive compensation and stockholder approval of any golden parachute payments not previously approved.

In addition, the JOBS Act provides that an emerging growth company can take advantage of an extended transition period for complying with new or revised accounting standards. This allows an emerging growth company to delay the adoption of these accounting standards until they would otherwise apply to private companies. We have elected to take advantage of this extended transition period.

We may choose to take advantage of some, but not all, of the available exemptions for emerging growth companies. We cannot predict whether investors will find our common stock less attractive if we rely on these exemptions. If some investors find our common stock less attractive as a result, there may be a less active trading market for our common stock and our stock price may be reduced or more volatile.

General Risk Factors

We or third parties with whom we have relationships may be adversely affected by natural or manmade disasters, public health emergencies and other natural catastrophic events, and our business continuity and disaster recovery plans may not adequately protect us from a serious disaster.

Natural or manmade disasters could severely disrupt our operations and have a material adverse effect on our business, results of operations, financial condition and prospects. If a natural disaster, public health emergency, power outage or other event occurred that prevented us from using all or a significant portion of our facilities, that damaged our infrastructure or that otherwise disrupted operations, it may be difficult or, in certain cases, impossible for us to continue our business for a substantial period of time, and our research and development activities could be setback or delayed. The disaster recovery and business continuity plans we have in place may prove inadequate in the event of a serious disaster or similar event. We may incur substantial expenses as a result of the limited nature of our disaster recovery and business continuity plans, which could have a material adverse effect on our business, and such an event could disrupt our operations, cause us to incur remediation costs, damage our reputation and cause a loss of confidence in us and our or third parties' ability to conduct clinical trials, which could adversely affect our reputation and delay our research and development programs.

Unstable market and economic conditions may have serious adverse consequences on our business, financial condition and stock price.

Global credit and financial markets have experienced extreme volatility and disruptions in the past several years, including severely diminished liquidity and credit availability, declines in consumer confidence, declines in economic growth, increases in unemployment rates and uncertainty about economic stability, and similar deterioration in the credit and financial markets and confidence in economic conditions may occur in the future. Our general business strategy may be adversely affected by any such economic downturn, volatile business environment or unpredictable and unstable market conditions. If the current equity and credit markets deteriorate, or do not improve, it may make any necessary debt or equity financing more difficult, more costly and more dilutive. Failure to secure any necessary financing in a timely manner and on favorable terms could have a material adverse effect on our growth strategy, financial performance and stock price and could require us to delay or abandon clinical development plans. In addition, there is a risk that one or more of our current service providers, manufacturers or others with whom we have strategic relationships may not survive any difficult economic times, which could directly affect our ability to attain our operating goals.

As of December 31, 2021, we had cash and cash equivalents of $143.7 million. While we are not aware of any downgrades, material losses or other significant deterioration in the fair value of our cash equivalents since December 31, 2021, deterioration of the global credit and financial markets could negatively impact our current portfolio of cash equivalents or our ability to meet our financing objectives. Furthermore, our stock price may decline due in part to the volatility of the stock market and any general economic downturn.

The market price of our common stock may be volatile and fluctuate substantially, which could result in substantial losses for purchasers of our common stock.

The market price of our common stock is likely to be highly volatile and may fluctuate substantially due to many factors, including:

- inconsistent trading volume levels of our common stock;
- announcements or expectations regarding debt or equity financing efforts;
- sales of common stock by us, our insiders or our other stockholders;
- actual or anticipated fluctuations in our financial condition and operating results;
- failure to meet or exceed financial estimates and projections of the investment community or that we provide to the public;
- results from or delays in our studies or trials, or those of our collaborators, competitors or companies perceived to be similar to us;
- delay, failure or discontinuation of any of our product development and research programs, or those of our collaborators, competitors or companies perceived to be similar to us;
- announcements about new research programs or product candidates from us or our collaborators, our competitors or companies perceived to be similar to us;
- announcements by us, our collaborators, our competitors or companies perceived to be similar to us relating to significant acquisitions, strategic partnerships or alliances, joint ventures, collaborations or capital commitments;
- actual or anticipated changes in our growth rate relative to our competitors or companies perceived to be similar to us;

- fluctuations in the valuation of our collaborators, our competitors or companies perceived to be comparable to us;
- a lack of, limited or withdrawal of coverage by security analysts, or positive or negative recommendations by them;
- actual or expected changes in estimates as to financial results, development timelines or recommendations by securities analysts;
- publication of research reports about us, genome editing or the biopharmaceutical industries;
- developments or changing views regarding the use of genomic products, including those that involve genome editing;
- our ability to effectively manage our growth;
- the recruitment or departure of key personnel;
- the results of any efforts by us to identify, develop, acquire or in-license additional product candidates, products or technologies;
- unanticipated serious safety concerns related to the use of any of our product candidates, or those of our competitors or companies perceived to be similar to us;
- the termination of a collaboration agreement, licensing agreement or other strategic arrangement or the inability to establish additional strategic arrangements on favorable terms, or at all;
- regulatory actions with respect to any of our product candidates, or those of our competitors or companies perceived to be similar to us;
- developments or disputes concerning patent applications, issued patents or other proprietary rights;
- regulatory or legal developments in the United States and other countries;
- changes in physician, hospital, or healthcare provider practices that may make our or our collaborators' products less useful;
- changes in the structure of healthcare payment systems;
- significant lawsuits, such as products liability, patent or stockholder litigation;
- short sales of our common stock; and
- general economic, industry and market conditions.

These and other market and industry factors may cause the market price and demand for our common stock to fluctuate substantially, regardless of our actual operating performance. These factors may have a material adverse effect on the market price and liquidity of our common stock, which may limit or prevent you from readily selling your shares of common stock and may affect our ability to obtain financing or enter into desired strategic relationships.

If securities or industry analysts issue an adverse or misleading opinion regarding our common stock, our stock price and trading volume could decline.

The trading market for our common stock relies in part on the research and reports that industry or securities analysts publish about us or our business. We do not control these analysts. If any of the analysts who cover us issue an adverse or misleading opinion regarding us, our business model, our intellectual property or our stock performance, or if our preclinical studies and clinical trials and operating results fail to meet the expectations of analysts, our stock price would likely decline. If one or more of these analysts ceases coverage of us or fails to publish reports on us regularly, we could lose visibility in the financial markets, which in turn could cause our stock price or trading volume to decline.

Item 1B. Unresolved Staff Comments

None.

Item 2. Properties.

We currently occupy approximately 69,500 square feet of office and laboratory space at our corporate headquarters in Durham, North Carolina under a lease that expires in 2024. We also occupy approximately 33,800 square feet of manufacturing, laboratory and office space used for our MCAT facility in Research Triangle Park, North Carolina under a lease that expires in 2027.

Item 3. Legal Proceedings.

From time to time we may be involved in claims and proceedings arising in the course of our business. The outcome of any such claims or proceedings, regardless of the merits, is inherently uncertain. We are not currently party to any material legal proceedings.

Item 4. Mine Safety Disclosures.

Not applicable.

PART II

Item 5. Market for Registrant's Common Equity, Related Stockholder Matters and Issuer Purchases of Equity Securities.

Our common stock trades on The Nasdaq Global Select Market under the symbol "DTIL."

Holders of Common Stock

As of March 8, 2022, there were approximately 29 holders of record of our common stock. This number does not include "street name" or beneficial holders, whose shares are held of record by banks, brokers, financial institutions and other nominees.

Dividend Policy

We intend to retain future earnings, if any, to finance the operation and expansion of our business and do not anticipate paying any cash dividends in the foreseeable future. In addition, pursuant to the terms of our Revolving Line, we are prohibited from paying cash dividends without the prior written consent of PWB and future debt instruments may materially restrict our ability to pay dividends on our common stock. Any future determination related to our dividend policy will be made at the discretion of our board of directors after considering our financial condition, results of operations, capital requirements, business prospects and other factors our board of directors deems relevant, and subject to any restrictions applicable to us contained in any future financing instruments.

Item 6. [Reserved].

Item 7. Management's Discussion and Analysis of Financial Condition and Results of Operations.

The following discussion and analysis of our financial condition and results of operations should be read in conjunction with our consolidated financial statements and the related notes to those statements included elsewhere in this Annual Report on Form 10-K. Some of the information contained in this discussion and analysis or set forth elsewhere in this Annual Report on Form 10-K, including information with respect to our plans and strategy for our business, includes forward-looking statements that involve risks and uncertainties. As a result of many important factors, including those set forth in Part I. Item 1A. "Risk Factors" of this Annual Report on Form 10-K, our actual results could differ materially from the results described in, or implied by, these forward-looking statements. As used in this Annual Report on Form 10-K, unless the context otherwise requires, references to "we," "us," "our," the "Company" and "Precision" refer to Precision BioSciences, Inc. and its subsidiaries on a consolidated basis.

A discussion regarding our financial condition and results of operation for the year ended December 31, 2021 compared to the year ended December 31, 2020 is presented below. A discussion regarding our financial condition and results of operations for the year ended December 31, 2020 compared to the year ended December 31, 2019 is included under "Management's Discussion and Analysis of Financial Condition and Results of Operations" in our Annual Report on 10-K for the year ended December 31, 2020 filed on March 18, 2021

Overview

We are a clinical stage gene editing company dedicated to improving life by developing *ex vivo* allogeneic CAR T immunotherapies and *in vivo* therapies for genetic and infectious diseases with the application of our wholly owned proprietary ARCUS genome editing platform. The foundation of ARCUS is a natural homing endonuclease which allows us to replicate precise gene editing as it evolved in nature. ARCUS is designed to be precise in its specificity and versatile in its design for gene knock out as well as complex edits with gene insertion and gene repair. ARCUS is also unique in its relatively small size which potentially allows delivery to a wider range of cells and tissues using viral and non-viral gene delivery methods.

We believe our CAR T cells are the only allogeneic CAR T cells in human clinical trials made with a single gene editing step designed to specifically avoid the potentially deleterious effects of making multiple edits to T cells. We are simultaneously conducting a Phase 1/2a clinical trial evaluating PBCAR0191 as a potential first-in-class and a Phase 1 clinical trial evaluating PBCAR19B as, if approved, a potential best-in-class CD19-targeting CAR T cell therapies in adult patients with R/R, B-cell malignancies.

Made from donor-derived T cells modified using our ARCUS genome editing technology, PBCAR0191 recognizes the well characterized tumor cell surface protein CD19, an important and validated target in several B-cell cancers, and PBCAR0191 is designed to avoid GvHD, a significant complication associated with donor-derived, cell-based therapies. We presented updated data from the PBCAR0191 study utilizing an enhanced lymphodepletion regimen in December 2021 at the 63rd ASH Annual Meeting.

PBCAR19B is a novel immune-evading stealth cell candidate employing a single-gene edit in an effort to knock-down β2m designed for evading T cell rejection, while also inserting a HLA-E transgene to further evade rejection from natural killer cells. We initiated a clinical trial of PBCAR19B in patients with R/R NHL in mid-2021 and completed dosing at Dose Level one. We plan to commence dosing at the next dose level with clinical trial material from an optimized manufacturing process once released and expect to provide a program update in mid-2022.

In January 2021, we closed the Development and License Agreement with Lilly to discover and develop *in vivo* gene editing product candidates incorporating our ARCUS nucleases. Lilly has initially nominated DMD, a genetic disease affecting the muscles. Lilly has also nominated a liver-directed target and a CNS directed target and has the right to nominate up to three additional gene targets over the first four years of the agreement. We will be responsible for conducting certain pre-clinical research and IND-enabling activities with respect to such gene targets.

In April 2021, we entered into the Program Purchase Agreement with Servier, pursuant to which we reacquired all of our global development and commercialization rights previously granted to Servier pursuant to the Servier Agreement, and mutually terminated the Servier Agreement. This includes our two clinical stage CD19-targeting allogeneic CAR T candidates, PBCAR0191 and PBCAR19B stealth cell, as well as four additional product targets.

In September 2021, we entered into an exclusive license agreement with Tiziana to evaluate foralumab, a fully human anti-CD3 mAb, as a lymphodepleting agent in conjunction with our allogeneic CAR T cells for the potential treatment of cancers. This agreement reflects our ongoing pursuit of a potential best-in-class allogeneic CAR T cell therapy.

In November 2021, we announced that we will not continue development of PBCAR20A based on data observed to date in a heterogeneous R/R NHL population previously treated with anti-CD20 monoclonal antibodies, as treatment with PBCAR20A did not result in compelling response rates in a Phase 1/2a clinical study. While this study provided important information regarding allogeneic CAR T dosing and lymphodepletion regimens, we intend to focus our clinical efforts in R/R lymphoma on CD19 targeting programs, as we believe CD19 is a more robust antigenic target in R/R heterogeneous NHL populations. All subjects enrolled in the study and evaluated for treatment with PBCAR20A had acceptable tolerability with no GvHD, no Grade ≥ 3 cytokine release syndrome, and no Grade ≥ 3 neurotoxicity.

In December 2021, we announced that we entered into an agreement with a syndicate of investors led by ACCELR8 to separate our wholly owned Elo Life Systems subsidiary and create an independent food and agriculture business. The transaction enables us to focus exclusively on human therapeutics.

We expect *in vivo* therapies for genetic and infectious diseases to be a significant focus of our operations long-term because the differentiated attributes of ARCUS are particularly advantageous for this type of application. *In vivo* gene correction involves the delivery of ARCUS nucleases directly into a patient's cells to treat disease at the level of the underlying DNA. *In vivo* genome editing is more complex and challenging than *ex vivo* approaches like CAR T cells due to the need to safely deliver ARCUS directly to cells in the body. We believe that *in vivo* applications are particularly well suited to ARCUS because they require extremely low levels of off-target editing and efficient delivery.

Looking ahead to the remainder of 2022 and beyond, we aim to further evaluate ARCUS clinically with the goal of positively impacting human health. In mid-2022, we plan to provide updates on PBCAR0191, PBCAR19B, and PBCAR269A. In the *in vivo* gene editing pipeline, we expect to submit three INDs or CTAs in the next three years, including trials to evaluate: PBGENE-PCSK9 for the treatment of FH, PBGENE-PH1 for the treatment of PH1 and PBGENE-HBV for the treatment of chronic HBV.

In August 2021, we entered into a development and license agreement with iECURE, a mutation-agnostic *in vivo* gene editing company co-founded by James M. Wilson, M.D., Ph.D. Under the iECURE Agreement, iECURE will advance our wholly owned PBGENE-PCSK9 candidate through preclinical activities as well as a Phase 1 clinical trial in FH, with a CTA filing expected as early as the end of 2022. iECURE will also use our PCSK9-directed ARCUS nuclease to develop gene-insertion therapies for four other pre-specified rare genetic diseases, including OTC deficiency, Citrullinemia Type 1, PKU, and another program focused on liver disease. We received a partial equity stake in iECURE and are eligible to receive milestone and mid-single digit to low double digit royalty payments on sales of iECURE products developed with ARCUS.

Pre-clinical research continues to progress for our wholly owned *in vivo* gene correction program applying ARCUS to knock out the HAO1 gene as a potential one-time treatment for PH1. In September 2021, we presented NHP data showing on average, a 98.0% reduction in HAO1 mRNA and a 97.9% reduction in the encoded protein after a single administration of an AAV vector encoding ARCUS. We have initiated IND-enabling activities and expect to submit an IND/CTA in 2023 for PBGENE-PH1 delivered by LNP.

Our gene editing program for chronic HBV applies ARCUS to knock out persistent cccDNA and potentially reduce viral persistence. Previously reported preclinical data has shown that ARCUS efficiently targeted and degraded HBV cccDNA in HBV-infected primary human hepatocytes and reduced expression of HBsAg by as much as 95%. Similar levels of HBsAg reduction were observed in a newly developed mouse model of HBV infection following administration of ARCUS mRNA using LNP delivery. We expect to submit an IND/CTA in 2024 for our HBV program.

Since our formation in 2006, we have devoted substantially all of our resources to developing ARCUS, conducting research and development activities, recruiting skilled personnel, developing manufacturing processes, establishing our intellectual property portfolio and providing general and administrative support for these operations. We have financed our operations primarily through proceeds from upfront and milestone payments from collaboration and licensing agreements, our IPO, private placements of our convertible preferred stock and convertible debt financings, at-the-market offerings of common stock, and borrowings on credit facilities.

Since our inception, we have incurred significant operating losses and have not generated any revenue from the sale of products. Our ability to generate any product revenue or product revenue sufficient to achieve profitability will depend on the successful development and eventual commercialization of one or more of our product candidates or the product candidates of our collaborators for which we may receive milestone payments or royalties. As of December 31, 2021, we had an accumulated deficit of $316.7 million.

We expect our operating expenses to increase substantially in connection with our ongoing CAR T clinical trials and the expansion of our *in vivo* product development programs and capabilities. We will not generate revenue from product sales unless and until we successfully complete clinical development and obtain regulatory approval for one of our product candidates or the product candidates of our collaborators for which we may receive milestone payments or royalties. If we obtain regulatory approval for any of our

product candidates, we expect to incur significant expenses related to developing our commercialization capability to support product sales, marketing and distribution. In addition, we expect to continue to incur additional costs associated with operating as a public company.

As a result of these anticipated expenditures, we will need additional financing to support our continuing operations. Until such time as we can generate significant revenue from product sales, if ever, we expect to finance our cash needs through a combination of public equity, debt financings or other sources, which may include current and new collaborations with third parties. Adequate additional financing may not be available to us on acceptable terms, or at all. Our inability to raise capital as and when needed would have a negative impact on our financial condition and our ability to pursue our business strategy. We cannot assure you that we will ever generate significant revenue to achieve profitability.

Because of the numerous risks and uncertainties associated with the development of therapeutic products, we are unable to predict the timing or amount of increased expenses or when or if we will be able to achieve or maintain profitability. Even if we are able to generate revenue from product sales, we may not become profitable. If we fail to become profitable or are unable to sustain profitability on a continuing basis, then we may be required to raise additional capital on terms that are unfavorable to us or we may be unable to continue our operations at planned levels and be forced to reduce or terminate our operations.

Impact of the COVID-19 Pandemic

We are closely monitoring how the ongoing COVID-19 pandemic and variants thereof continues to affect our employees, business, preclinical studies and clinical trials. The Company has taken steps in line with guidance from the U.S. Centers for Disease Control and Prevention ("CDC") and the State of North Carolina to protect the health and safety of its employees and the community. We have implemented measures to mitigate exposure risks and support operations. We initiated a health and safety program addressing mandatory use of face masks, mandatory vaccinations, social distancing, sanitary handwashing practices, use of personal protective equipment stations, stringent cleaning and sanitization of all facilities and measures to reduce total occupancy in facilities. We have also implemented temperature and symptom screening procedures at each location, and we have continuously communicated to all our Precisioneers that if they are not comfortable coming to work, regardless of role, then they do not have to do so.

We are working closely with our clinical sites, physician partners and the patient community to monitor and manage the impact of the COVID-19 pandemic and variants thereof. We remain committed to our clinical programs and development plans, however, disruptions, competing resource demands and safety concerns caused by the COVID-19 pandemic and variants thereof have caused, and are likely to continue to cause delays in our clinical trial site activation and impact our ability to enroll patients. We may also experience other difficulties, disruptions or delays in conducting preclinical studies or initiating, enrolling, conducting or completing our planned and ongoing clinical trials, and we may incur other unforeseen costs as a result. We expect that the COVID-19 pandemic and variants thereof may continue to impact our business, including our preclinical studies and clinical trials. At this time, there is still significant uncertainty relating to the trajectory of the COVID-19 pandemic and variants thereof and impact of related responses. The impact of the COVID-19 pandemic and variants thereof on our preclinical studies and any further impact to our clinical trials will largely depend on future developments, which are highly uncertain and cannot be predicted with confidence, such as the ultimate geographic spread of the disease, the duration of the pandemic, travel restrictions and social distancing in the United States and other countries, business closures or business disruptions, the ultimate impact of the COVID-19 pandemic and variants thereof on financial markets and the global economy, and the effectiveness of actions taken in the United States and other countries to contain and treat the disease. The CARES Act was signed into law on March 27, 2020, which provides for, among other things, the deferral of the deposit and payment of certain taxes. Pursuant to the CARES Act, we continue to elect to defer payment of the employer's share of social security taxes since May 1, 2020. See "*Risk Factors— The ongoing novel coronavirus disease, COVID-19 has impacted, and may continue to impact, our business, and any other pandemic, epidemic or outbreak of an infectious disease may materially and adversely impact our business, including our preclinical studies and clinical trials.*" In Part I. Item 1A. of this Annual Report on Form 10-K.

Collaborations

Eli Lilly and Company

In November 2020, we entered into the Development and License Agreement with Lilly to utilize ARCUS for the research and development of potential *in vivo* therapies for genetic disorders. Lilly has initially nominated DMD and two gene targets for other genetic disorders, and has the right to nominate up to three additional gene targets for genetic disorders over the Nomination Period. Lilly may extend the Nomination Period for an additional two years from the date on which such initial Nomination Period ends, upon Lilly's election and payment of an extension fee. Under the terms of the Development and License Agreement, Lilly will receive an exclusive license to research, develop, manufacture and commercialize the resulting licensed products to diagnose, prevent and treat any and all diseases by *in vivo* gene editing directed against the applicable gene target. The Development and License Agreement provides that we will be responsible for conducting certain pre-clinical research and IND-enabling activities with respect to the gene targets nominated by Lilly to be subject to the collaboration, including manufacture of initial clinical trial material for the first licensed

product. Lilly will be responsible for, and must use commercially reasonable efforts with respect to, conducting clinical development and commercialization activities for licensed products resulting from the collaboration, and may engage us for additional clinical and/or initial commercial manufacture of licensed products.

In January 2021, we and Lilly closed the Development and License Agreement following clearance under the Hart-Scott-Rodino Antitrust Improvements Act of 1976, as amended (the "HSR Act"). In connection with the closing, we received an upfront cash payment of $100.0 million as well as $35.0 million from Lilly's purchase of 3,762,190 newly issued shares of our common stock pursuant to a stock purchase agreement as described below (the "Stock Purchase Agreement"). We will also be eligible to receive milestone payments of up to an aggregate of $420.0 million per licensed product as well as nomination fees for additional targets and certain research funding. If licensed products resulting from the collaboration are approved and sold, we will also be entitled to receive tiered royalties ranging from the mid-single digit percentages to the low-teens percentages on world-wide net sales of the licensed products, subject to customary potential reductions. Lilly's obligation to pay royalties to us expires on a country-by-country and licensed product-by-licensed product basis, upon the latest to occur of certain events related to expiration of patents, regulatory exclusivity or a period of ten years following first commercial sale of the licensed product.

We have the right to elect to co-fund the clinical development of one licensed product, which may be selected from among the third or any subsequent licensed products to reach IND or CTA filing. If we elect to co-fund such licensed product, we would reimburse Lilly for a portion of the clinical development expenses for such product and, in exchange, each royalty tier with respect to net sales of such licensed product would be increased by a low single digit percentage. During the term of the Development and License Agreement, we may not (and may not license or collaborate with any third party to) research, develop, or commercialize any *in vivo* gene editing product directed against any gene targets that have been nominated and are subject to the Development and License Agreement.

Unless earlier terminated, the Development and License Agreement will remain in effect on a licensed product-by-licensed product and country-by-country basis until the expiration of a defined royalty term for each licensed product and country. Lilly has the right to terminate the Development and License Agreement for convenience by providing advance notice to us. Either party may terminate the Development and License Agreement (i) for material breach by the other party and a failure to cure such breach within the time period specified in the agreement or (ii) due to a challenge to its patents brought by the other party.

During the twelve months ended December 31, 2021 we recognized revenue under the agreement with Lilly of approximately $21.0 million. We did not recognize any revenue under the agreement with Lilly in 2020. Deferred revenue related to the agreement with Lilly amounted to $88.3 million as of December 31, 2021, of which $21.2 million was included in current liabilities. No deferred revenue related to the Lilly Agreement was recorded as of December 31, 2020.

iECURE

In August 2021, we entered into the iECURE Agreement, under which iECURE plans to advance our PBGENE-PCSK9 candidate through preclinical activities as well as a Phase 1 clinical trial as partial consideration for a license to our PCSK9-directed ARCUS nuclease to develop gene-insertion therapies for four other rare genetic diseases, including OTC deficiency, Citrullinemia Type 1, PKU, and another program focused on liver disease.

Pursuant to the iECURE Agreement, we retain the rights to PBGENE-PCSK9, including all products developed for indications with increased risk of severe cardiovascular events such as FH. Simultaneously with the entry into the iECURE Agreement, we entered into an Equity Issuance Agreement with iECURE, pursuant to which iECURE granted us partial equity ownership in iECURE as partial consideration for the license to use its PCSK9-directed ARCUS nuclease. We concluded that the iECURE Equity Issuance Agreement is to be combined with the iECURE Agreement (together, the "iECURE Agreements") for accounting purposes. Additionally, we are eligible to receive milestone and mid-single digit to low double digit royalty payments on sales of iECURE products developed with ARCUS.

We assessed the iECURE Agreements in accordance with ASC 606, *Revenue from Contracts with Customers* ("ASC 606") and concluded that the promises in the iECURE Agreements represent a transaction with a customer. Further, we concluded that the iECURE Agreements contain the following promises: (i) the PCSK9 license and (ii) JSC Participation. The JSC participation was determined to be an immaterial promise as the time commitment and related cost associated with performance of JSC participation is expected to be inconsequential to the total consideration in the contract. Accordingly, we concluded that the promise of the PCSK9 license is the sole performance obligation in the iECURE Agreements.

The fair value of the iECURE equity and the estimated fair value of the costs to be incurred by iECURE to progress our PBGENE-PCSK9 candidate through preclinical activities as well as a Phase 1 clinical trial were concluded to be non-cash consideration, and as such were included in the transaction price of the iECURE Agreements. We concluded the PCSK9 license represents functional intellectual property in accordance with ASC 606 given we will not be providing any additional services to iECURE outside of the right to use the PCSK9 license. Therefore, the fair value of the iECURE equity and the fair value of the costs to be incurred by

iECURE to progress our PBGENE-PCSK9 candidate through a Phase 1 clinical trial was recognized at the inception of the iECURE Agreements.

The fair value of the iECURE equity at inception of the iECURE agreements was assessed to be $0.5 million and was initially recorded to the investment in equity securities line item of the consolidated balance sheets. As further discussed in Note 12 to the consolidated financial statements, "Fair Value Measurements", on issuance, we elected to account for the iECURE equity at fair value under ASC 825, *Financial Instruments* ("ASC 825"). Accordingly, we adjust the carrying value of the iECURE equity to fair value each reporting period with any changes in fair value recorded to other income (expense). The fair value of the costs to be incurred by iECURE to progress our PBGENE-PCSK9 candidate through a Phase 1 clinical trial was assessed to be $17.4 million and was recorded to the prepaid expenses and other assets line items of the consolidated balance sheets. The PCSK9 Prepaid will be amortized to research and development expense on a pro-rata basis as iECURE incurs costs to progress our PBGENE-PCSK9 candidate through a Phase 1 clinical trial.

During the year ended December 31, 2021, we recognized revenue under the iECURE agreements of $17.9 million and $4.4 million of research and development expense related to amortization of the PCSK9 Prepaid. As of December 31, 2021, the remaining balance of the PCSK9 Prepaid was $13.0 million, which is included in the prepaid expenses and other assets line items of the consolidated balance sheets in the amounts of $10.4 million and $2.6 million, respectively.

Servier

On April 9, 2021, we entered into the Program Purchase Agreement with Servier, pursuant to which we reacquired all of our global development and commercialization rights previously granted to Servier pursuant to the Servier Agreement, and mutually terminated the Servier Agreement.

Pursuant to the Servier Agreement, we had developed certain allogeneic CAR T candidates, including PBCAR0191 and the stealth cell PBCAR19B, each targeting CD19, as well as four additional product targets. Pursuant to the Program Purchase Agreement, we regained full global rights to research, develop, manufacture and commercialize products resulting from such programs, with sole control over all activities. Additionally, per the terms of the Program Purchase Agreement we do not have an obligation to continue development of the Servier Targets. With respect to products directed to CD19, Servier has certain rights of negotiation, which may be exercised during a specified time period if we elect to initiate a process or entertain third party offers for partnering such products.

Pursuant to the terms of the Program Purchase Agreement, we made a payment of $1.25 million in cash to Servier and agreed to waive earned milestones totaling $18.75 million that would have been otherwise payable to us. The $1.25 million cash payment to Servier is classified as research and development expense in the consolidated statement of operations for the year ended December 31, 2021. The waiver of earned milestones resulted in a $18.75 million reduction in accounts receivable and deferred revenue.

The Program Purchase Agreement also requires us to make certain payments to Servier based on the achievement of regulatory and commercial milestones for each product, and a low- to mid-single-digit percentage royalty (subject to certain reductions) based on net sales of approved products, if any, resulting from any continued development and commercialization of the programs by us, for a period not to exceed ten years after first commercial sale of the applicable product in the United States or certain countries in Europe. If we enter into specified product partnering transactions, the Program Purchase Agreement requires us to pay to Servier a portion of certain consideration received pursuant to such product partnering transactions in lieu of the foregoing milestones (with the exception of a one-time clinical phase development milestone) and royalties. For additional discussion of accounting for payment obligations arising from the Program Purchase Agreement, refer to Note 7, "Commitments and Contingencies," in the consolidated financial statements.

Upon the closing of the Program Purchase Agreement, management concluded that the combined performance obligation associated with the Servier Agreement was fully satisfied as we are no longer required to perform research and development work on the Servier targets and we regained all of our global development and commercialization rights previously granted to under the Servier Agreement. Accordingly, all remaining deferred revenue related to the Servier agreement was recognized as revenue in the year ended December 31, 2021.

Under the Servier Agreement, we recognized $72.9 million and $18.0 million in revenue during the years ended December 31, 2021 and December 31, 2020, respectively. No deferred revenue related to the Server Agreement was recorded as of December 31, 2021, while deferred revenue as of December 31, 2020 amounted to $82.9 million.

Gilead

In July 2020, Gilead notified us of its termination of the Gilead Agreement, to develop genome editing tools using ARCUS to target viral DNA associated with HBV. Pursuant to the termination notice, the Gilead Agreement terminated on September 4, 2020. Upon

termination, we regained full rights and all data we generated for the *in vivo* chronic HBV program developed under the Gilead Agreement.

During the years ended December 31, 2021 and 2020, we recognized no revenue and approximately $3.9 million of revenue under the Gilead Agreement, respectively. The Company did not have deferred revenue related to the Gilead Agreement as of December 31, 2021 or December 31, 2020. No development or sales-based milestone payments were received under the Gilead Agreement.

Tiziana

In September 2021, we entered into an exclusive license agreement to evaluate Tiziana's foralumab, a fully human anti-CD3 mAb, as a lymphodepleting agent in conjunction with our allogeneic CAR T cells for the potential treatment of cancers. We will investigate foralumab first in combination with an anti-CD19 CAR T and plan an IND update in 2022 to enable combination use.

SpringWorks Therapeutics

In September 2020, we entered into a Clinical Trial Collaboration Agreement with SpringWorks. Pursuant to such agreement, PBCAR269A will be evaluated in combination with nirogacestat, SpringWorks' investigational GSI, in patients with R/R multiple myeloma. Under the terms of the agreement, we will bear all costs with the conduct of the clinical trial including providing PBCAR269A for use in the trial, and SpringWorks is responsible for providing nirogacestat at its sole cost and expense. The first patient was dosed in the combination arm in June 2021.

Trustees of the University of Pennsylvania

In January 2018, we entered into a research, collaboration and license agreement with Penn to collaborate on the preclinical development for gene editing products involving the delivery of an ARCUS nuclease. In April 2020, both parties agreed to coordinate a wind-down of all activities in their entirety under the agreement, effective as of June 2020, however, in August 2020 and subsequently in January 2021, both parties agreed to extend certain portions of the agreement through 2022. We will not be required to make termination payments to Penn.

Components of Our Results of Operations

Revenue

To date, we have not generated any revenue from product sales and do not expect to generate any revenue from product sales in the foreseeable future. We record revenue from collaboration agreements, including amounts related to upfront payments, milestone payments, annual fees for licenses of our intellectual property and research and development funding.

Research and Development Expenses

Research and development expenses consist primarily of costs incurred for our research activities, including our discovery efforts and the development of our product candidates. These include the following:

- salaries, benefits and other related costs, including share-based compensation expense, for personnel engaged in research and development functions;
- expenses incurred under agreements with third parties, including CROs and other third parties that conduct preclinical research and development activities and clinical trials on our behalf;
- costs of developing and scaling our manufacturing process and manufacturing drug products for use in our preclinical studies and ongoing and future clinical trials, including the costs of CMOs, and our MCAT facility that will manufacture our clinical trial material for use in our preclinical studies and ongoing and potential future clinical trials;
- costs of outside consultants, including their fees and related travel expenses;
- costs of laboratory supplies and acquiring, developing and manufacturing preclinical study and clinical trial materials;
- license payments made for intellectual property used in research and development activities; and
- facility-related expenses, which include direct depreciation costs and expenses for rent and maintenance of facilities and other operating costs if specifically identifiable to research activities.

We expense research and development costs as incurred. We track external research and development costs, including the costs of laboratory supplies and services, outsourced research and development, clinical trials, contract manufacturing, laboratory equipment

and maintenance and certain other development costs, by product candidate when the program IND application is accepted by the FDA. Internal and external costs associated with infrastructure resources, other research and development costs, facility related costs and depreciation and amortization that are not identifiable to a specific product candidate are included in the platform development and early-stage research expenses category.

Research and development activities are central to our business model. We expect that our research and development expenses will continue to increase substantially for the foreseeable future and will comprise a larger percentage of our total expenses as we continue our clinical trials for our *ex vivo* allogeneic CAR T immunotherapies and development of our *in vivo* therapies for genetic and infectious diseases. These expected increases in research and development expenses related to development of human therapeutic product candidates are expected to be partially offset by reductions in research and development expenses related to food and agricultural product candidates as we completed the Elo transaction in 2021 and will no longer be contributing capital towards the development of food and agricultural product candidates.

We cannot determine with certainty the duration and costs of ongoing and future clinical trials of our CD19, CD19B, and BCMA product candidates, or any other product candidate we may develop or if, when or to what extent we will generate revenue from the commercialization and sale of any product candidate for which we obtain marketing approval. We may never succeed in obtaining marketing approval for any product candidate. The duration, costs and timing of clinical trials and development of our CD19, CD19B, and BCMA product candidates, and any other our product candidate we may develop will depend on a variety of factors, including:

- the scope, rate of progress, expense and results of clinical trials of our CD19, CD19B and BCMA product candidates, as well as of any future clinical trials of other product candidates and other research and development activities that we may conduct;
- increased costs of additional clinical sites to address slowed enrollment due to the impact of the COVID-19 pandemic and variants thereof or any similar pandemic;
- uncertainties in clinical trial design and patient enrollment rates;
- the actual probability of success for our product candidates, including their safety and efficacy, early clinical data, competition, manufacturing capability and commercial viability;
- significant and changing government regulation and regulatory guidance;
- the timing and receipt of any marketing approvals; and
- the expense of filing, prosecuting, defending and enforcing any patent claims and other intellectual property rights

A change in the outcome of any of these variables with respect to the development of a product candidate could mean a significant change in the costs and timing associated with the development of that product candidate. For example, if the FDA or another regulatory authority were to require us to conduct clinical trials beyond those that we anticipate will be required for the completion of clinical development of a product candidate, or if we experience significant delays in our clinical trials due to slower than expected patient enrollment or other reasons, we would be required to expend significant additional financial resources and time on the completion of clinical development.

General and Administrative Expenses

General and administrative expenses consist primarily of salaries and other related costs, including share-based compensation, for personnel in our executive, finance, business development, operations and administrative functions. General and administrative expenses also include legal fees relating to intellectual property and corporate matters; professional fees for accounting, auditing, tax and consulting services; insurance costs; travel expenses; and facility-related expenses, which include direct depreciation costs and expenses for rent and maintenance of facilities and other operating costs that are not specifically attributable to research activities.

We expect that our general and administrative expenses will increase in the future to meet our growing infrastructure needs.

Change in Fair Value of Equity Investment

On issuance, we elected to account for the iECURE equity at fair value under ASC 825. Accordingly, the Change in fair value of equity investment represents the change in fair value of the iECURE equity investment between reporting periods.

Gain on Deconsolidation of Subsidiary

The gain on deconsolidation of subsidiary was determined based on the difference between the book value of the net assets that we contributed to New Elo as part of the Elo Transaction as well as the fair value of the Promissory Note we received from New Elo and the fair value of our ownership in New Elo as of December 17, 2021.

Income from Equity Method Investments

Income from equity method investments represents our proportionate share of New Elo's net income.

Interest Income

Interest income consists of interest income earned on our cash and cash equivalents and Note Receivable.

Income Taxes

Since our inception in 2006, we have generated cumulative federal and state NOL and R&D credit carryforwards for which we have not recorded any net tax benefit due to the uncertainty around utilizing these tax attributes within their respective carryforward periods. As of December 31, 2021, we had federal, state, and foreign NOL carryforwards of $181.0 million, $122.2 million, and $0.4 million, respectively, which may be available to offset future taxable income. A portion of the U.S. federal NOL carryforwards in the amount of $19.7 million will begin to expire in 2030 while the remaining federal NOL carryforwards of $161.2 million carry forward indefinitely. The state NOL carryforwards begin to expire in 2025. The foreign NOLs carryforward indefinitely. As of December 31, 2021, we also had federal R&D tax credit carryforwards of $11.4 million, which begin to expire in 2027, and an amount less than $0.1 million, which begin to expire in 2030. As of December 31, 2021 and December 31, 2020, we had federal Orphan Drug credits of $9.5 million and $6.0 million, respectively, which begin to expire in 2038. As of December 31, 2021, we also have federal contribution carryforwards of $0.2 million, which begin to expire in 2022. We have recorded a full valuation allowance against our net deferred tax assets at each balance sheet date.

Results of Operations

Comparison of the Years Ended December 31, 2021 and December 31, 2020

The following table summarizes our results of operations for the years ended December 31, 2021 and December 31, 2020, together with the changes in those items in dollars:

(in thousands)	Years ended December 31, 2021	2020	Change
Revenue	$ 115,529	$ 24,285	$ 91,244
Operating expenses:			
Research and development	115,238	98,061	17,177
General and administrative	39,693	36,052	3,641
Total operating expenses	154,931	134,113	20,818
Loss from operations	(39,402)	(109,828)	70,426
Other income (expense), net:			
Gain on changes in fair value	2,555	—	2,555
Gain on deconsolidation of subsidiary	5,985	—	5,985
Income from equity method investments	184	—	184
Interest expense	(132)	—	(132)
Interest income	208	822	(614)
Total other income (expense), net	8,800	822	7,978
Net loss	$ (30,602)	$ (109,006)	$ 78,404

Revenue

Revenue for the year ended December 31, 2021 was $115.5 million, compared to $24.3 million for the year ended December 31, 2020. The increase of $91.2 million in revenue during the year ended December 31, 2021 was the result of a $54.8 million increase in revenue recognized under the Servier Agreement as the performance obligation was deemed fully satisfied upon the execution of the Program Purchase Agreement, a $21.0 million increase in revenue recognized under the Lilly Agreement as work began in 2021, a

$17.9 million increase in revenue recognized under the iECURE Agreement as the iECURE Agreement was executed in 2021, and a $2.9 million increase in revenue recognized from an agricultural partnering collaboration. These increases in revenue were partially offset by a $3.9 million decrease in revenue recognized from Gilead due to the termination of the Gilead Agreement in 2020 and a $1.5 million decrease in milestone revenue recognized from an agriculture industry collaboration partner.

Research and Development Expenses

(in thousands)	Years ended December 31, 2021	2020	Change
Direct research and development expenses by product candidate:			
CD19 external development costs	$ 8,486	$ 8,586	$ (100)
CD20 external development costs	3,666	6,660	(2,994)
BCMA external development costs	3,337	3,144	193
CD19B external development costs	2,948	—	2,948
Platform development and early-stage research expenses:			
Employee-related costs	41,620	37,301	4,319
Program Purchase Agreement costs and contract liability	11,250	—	11,250
Amortization of PCSK9 Prepaid	4,421	—	4,421
Laboratory supplies and services	14,529	12,225	2,304
Sublicensing royalty payable to Duke	1,111	—	1,111
Outsourced research and development	2,336	7,514	(5,178)
CMOs and research organizations	5,347	7,730	(2,383)
Laboratory equipment and maintenance	2,065	1,412	653
Facility-related costs	3,562	3,354	208
Depreciation and amortization	7,574	7,441	133
Licensing fees	2,585	2,415	170
Other research and development costs	401	279	122
Total research and development expenses	$ 115,238	$ 98,061	$ 17,177

Research and development expenses for the year ended December 31, 2021 were $115.2 million, compared to $98.1 million for the year ended December 31, 2020. The increase of $17.1 million was primarily due to a $17.1 million increase in platform development and early-stage research expenses, a $2.9 million increase in external development costs for our CD19B program as the CD19B Phase 1 clinical trial commenced in June 2021, and a $0.2 million increase in external development costs for our BCMA program, partially offset by decreases of $3.0 million in CD20 external development costs as development of PBCAR20A has been discontinued, and a $0.1 million decrease in CD19 external development costs.

Platform development and early-stage research expenses increased primarily due to a $11.3 million increase in expenses related to the Program Purchase Agreement in which a $10.0 million financial contract liability was accrued as it was deemed probable to occur and the $1.3 million cash payment to Servier, $4.4 million in expense related to amortization of the iECURE PCSK9 prepaid as a result of costs incurred by iECURE in the year ended December 31, 2021 to progress the Company's PBGENE-PCSK9 candidate through a Phase 1 clinical trial, a $4.3 million increase in employee-related expense associated with increased wages and share-based compensation expense, a $3.0 million increase in laboratory-related expenses, a $1.1 million sublicensing royalty payable to Duke on the Lilly upfront payment received. These increases in platform development and early-stage research expenses were partially offset by a $5.2 million decrease in outsourced research and development expense, and a $2.4 million decrease in CMO and research organization expense as costs associated with our CD19B program were allocated directly to the program beginning in 2021.

General and Administrative Expenses

General and administrative expenses were $39.7 million for the year ended December 31, 2021 compared to $36.1 million for the year ended December 31, 2020. The increase of $3.6 million was primarily due to an increase of $3.9 million in employee-related expense associated with increased wages, share-based compensation, and recruiting costs for key management personnel, a $0.6 million increase in information technology expenses, and a $0.5 million increase in insurance expense, partially offset by a $1.5 million decrease in legal fees.

Gain on Changes in Fair Value

The gain on changes in fair value was $2.6 million for the year ended December 31, 2021. The change in fair value is primarily attributed to an increase in the assessed fair value of our equity investment in iECURE from issuance in August 2021 to December 31, 2021. No change in fair value was recorded in the year ended December 30, 2020 as we did not account for any assets or liabilities at fair value in the consolidated balance sheets in the year ended December 31, 2020.

Gain on Deconsolidation of Subsidiary

The Gain on Deconsolidation of Subsidiary was $6.0 million for the year ended December 31, 2021 and represents the difference between the book value of the net assets that we contributed to New Elo as part of the Elo Transaction and the sum of the fair value of the Promissory Note we received from New Elo and the fair value of our Ownership in New Elo as of December 17, 2021. There was no gain on deconsolidation in the year ended December 31, 2020 as the Elo Transaction occurred in December 2021, and there were no such transactions that occurred in the year ended December 31, 2020.

Income from Equity Method Investments

Income from equity method investments was $0.2 million and represents our proportionate share of New Elo's net income from December 18, 2021 through December 31, 2021. We did not have any equity method investments in the year ended December 31, 2020.

Interest Expense

Interest expense was $0.1 million for the year ended December 31, 2021 consists of interest payments and debt discount amortization on debt outstanding during the year ended December 31, 2021. No interest expense was incurred during the year ended December 31, 2020.

Interest Income

Interest income was $0.2 million for the year ended December 31, 2021 compared to $0.8 million for the year ended December 31, 2020. The decrease of $0.6 million of interest income generated on our cash and cash equivalent balances was the result of lower interest rates in the year ended December 31, 2021, compared to the year ended December 31, 2020, partially offset by interest income earned on the Note Receivable that was issued in the year ended December 31, 2021.

Segment Results

The following tables summarize segment revenues and segment operating loss (see Note 14, "Segment Reporting," to our consolidated financial statements included elsewhere in this Annual Report on Form 10-K for additional information regarding our segments):

	For the Years Ended December 31,	
(in thousands)	**2021**	**2020**
Revenue:		
Therapeutics	$ 111,723	$ 21,863
Food	3,806	2,422
Total segment revenue	115,529	24,285
Segment operational cash expenditures:		
Therapeutics	$ 79,746	$ 71,841
Food	7,635	7,587
Total segment operational cash expenditures	87,381	79,428
Segment operating income (loss):		
Therapeutics	$ 31,977	$ (49,978)
Food	(3,829)	(5,165)
Total segment operating income (loss)	$ 28,148	$ (55,143)

Prior to the Elo Transaction on December 17, 2021, we evaluated the operating performance of our Therapeutics and Food segments based on segment operating income (loss). Segment operating income (loss) is derived by deducting operational cash expenditures, net, from GAAP revenue. Operational cash expenditures are cash disbursements made that are specifically identifiable to the reportable segment (including specifically identifiable research and development and property, equipment and software expenditures). The reportable segment operational cash expenditures include cash disbursements for compensation, laboratory supplies, purchases of property, equipment and software and procuring services from CROs, CMOs and research organizations. We did not allocate general operational expenses or non-cash income statement amounts to our reportable segments.

Therapeutics Segment

Revenue for the year ended December 31, 2021 was $111.7 million, compared to $21.9 million for the year ended December 31, 2020. The increase of $89.8 million was the result of a $54.8 million increase in revenue recognized under the Servier Agreement as the performance obligation was deemed fully satisfied upon the execution of the Program Purchase Agreement, a $21.0 million increase in revenue recognized under the Lilly Agreement as work began in 2021, and a $17.9 million increase in revenue recognized under the iECURE Agreement as the iECURE Agreement was executed in 2021. These increases in revenue were partially offset by a $3.9 million decrease in revenue recognized from Gilead due to the termination of the Gilead Agreement in 2020.

Segment operational cash expenditures were $79.7 million for the year ended December 31, 2021, compared to $71.8 million for the year ended December 31, 2020. The increase of $7.9 million in operational cash expenditures was primarily due to an increase in employee-related costs, payments under the Duke License, and the payment made to Servier in connection with the Program Purchase Agreement. These were partially offset by a decrease in capital expenditures for fixed assets and a reduction in payments to external vendors for early-stage research. Segment operating profit increased $82.0 million from a $50.0 million operating loss for the year ended December 31, 2020 to a $32.0 million operating profit for the year ended December 31, 2021 primarily due to the factors discussed above.

Food Segment

Revenue for the year ended December 31, 2021 was $3.8 million, compared to $2.4 million for the year ended December 31, 2020. The increase of $1.4 million was the result of a $2.9 million increase in revenue recognized from an agricultural partnering collaboration partially offset by a $1.5 million decrease in milestone revenue recognized from an agriculture industry collaboration partner.

Segment operational cash expenditures were $7.6 million for the years ended December 31, 2021 and December 31, 2020. Segment operating loss decreased $1.4 million from $5.2 million for the year ended December 31, 2020 to $3.8 million for the year ended December 31, 2021 primarily due to the factors discussed above.

Due to the completion of the Elo Transaction in December 2021, we no longer expect to generate revenue or incur cash expenditures related to the development of food and agricultural product candidates.

Liquidity and Capital Resources

Since our inception, we have incurred significant operating losses. We expect to incur significant expenses and operating losses for the foreseeable future as we advance the preclinical and clinical development of our product candidates. We expect that our research and development and general and administrative costs will continue to increase, including in connection with conducting preclinical studies and clinical trials for our product candidates, contracting with CROs and CMOs, the addition of laboratory equipment to MCAT in support of preclinical studies and clinical trials, expanding our intellectual property portfolio and providing general and administrative support for our operations. As a result, we will need additional capital to fund our operations, which we may obtain from additional equity or debt financings, collaborations, licensing arrangements or other sources.

There are no assurances that we will be successful in obtaining an adequate level of financing as and when needed to finance our operations on terms acceptable to us or at all, particularly in light of the economic downturn and ongoing uncertainty related to the COVID-19 pandemic and variants thereof. If we are unable to secure adequate additional funding as and when needed, we may have to significantly delay, scale back or discontinue the development and commercialization of one or more product candidates. In addition, the magnitude and duration of the COVID-19 pandemic and variants thereof and its impact on our liquidity and future funding requirements remains uncertain as of the filing date of this Annual Report on Form 10-K, as the pandemic continues to evolve globally. See “Impact of the COVID-19 Pandemic” above and “*Risk Factors— The ongoing novel coronavirus disease, COVID-19 has impacted, and may continue to impact, our business, and any other pandemic, epidemic or outbreak of an infectious disease may materially and adversely impact our business, including our preclinical studies and clinical trials”* in Part I. Item 1A. of this Annual Report on Form 10-K for a further discussion of the potential impact of the COVID-19 pandemic and its variants on our business.

We do not currently have any approved products and have never generated any revenue from product sales. Through the date of filing this Annual Report on Form 10-K, we have financed our operations primarily through proceeds from upfront and milestone payments from collaboration and licensing agreements, our IPO, private placements of our convertible preferred stock and convertible debt financings, at-the-market offerings of common stock, and borrowings on credit facilities.

As of December 31, 2021, we had raised approximately $659.4 million of proceeds from third parties through a combination of financings including our IPO, preferred stock and convertible note financings, at-the-market offerings of common stock as part of our shelf registration statement, upfront and milestone payments from customers, and funding from other strategic alliances and grants.

We also currently have an effective shelf registration statement on Form S-3 (No. 333-238857) filed with the SEC on June 1, 2020 (the "Form S-3") under which we may offer from time to time in one or more offerings any combination of common and preferred stock, debt securities, warrants and units of up to $200.0 million in the aggregate. As of December 31, 2021, we had sold 2,322,676 shares of our common stock in at-the-market offerings as part of our shelf registration statement, resulting in net proceeds of $25.5 million, after deducting agent commissions and issuance costs.

Cash Flows

Our cash and cash equivalents totaled $143.7 million as of December 31, 2021, compared to $89.8 million as of December 31, 2020.

The following table summarizes our sources and uses of cash for the periods presented:

	For the Years Ended December 31,	
(in thousands)	**2021**	**2020**
Net cash used in operating activities	$ (10,853)	$ (87,386)
Net cash used in investing activities	(5,803)	(5,031)
Net cash provided by financing activities	70,521	1,329
Increase (decrease) in cash and cash equivalents	$ 53,865	$ (91,088)

Cash Used in Operating Activities

Our primary use of cash is to fund operating expenses, which consist primarily of research and development and general and administrative expenses. Our losses have resulted from expenses incurred in connection with our research and development activities, including our clinical programs, preclinical development activities, and general and administrative costs associated with our operations. The use of cash in operating activities during the years ended December 31, 2021 and December 31, 2020 resulted from our net loss adjusted for non-cash items and changes in working capital.

Cash used in operating activities during the year ended December 31, 2021 was $10.9 million, compared to $87.4 million during the year ended December 31, 2020. The decrease in cash used in operating activities in the year ended December 31, 2021 was primarily driven by the $100.0 million upfront payment received from Lilly in January 2021, partially offset by increases in employee-related costs.

Cash Used in Investing Activities

Cash used in investing activities primarily relates to cash expenditures to acquire leasehold additions, equipment, software, and intangible assets. Net cash used in investing activities during the year ended December 31, 2021 was $5.8 million, compared to $5 million in the year ended December 31, 2020. The increase in cash used in investing activities during the year ended December 31, 2021 was primarily driven by a $0.8 million cash expenditure for the license to evaluate Tiziana's foralumab as a lymphodepletion agent in conjunction with our allogeneic CAR T therapeutics, which was capitalized as an intangible asset.

Cash Provided by Financing Activities

Net cash provided by financing activities during the year ended December 31, 2021 was $70.5 million, compared to $1.3 million during the year ended December 31, 2020. The higher cash provided by financing activities during the year ended December 31, 2021, compared to the year ended December 31, 2020, was primarily due to the $35.0 million in proceeds received under the Stock Purchase Agreement with Lilly, $25.5 million in net proceeds received from sales of our common stock under our shelf registration statement, a $6.1 million increase in proceeds from stock option exercises and $2.5 million in net proceeds received from borrowings on our revolving credit facility.

Debt Obligations

On May 19, 2021, Elo entered into a loan and security agreement with PWB for a term loan (the "Elo Loan") in the amount of $2.5 million. On December 14, 2021, the Company repaid all outstanding principal and interest on the Elo Loan with proceeds from the Revolving Line.

We may request advances on the Revolving Line up to an aggregate principal of $30.0 million. The Revolving Line matures and all outstanding principal amounts are due on June 23, 2023. The Company must also maintain an aggregate balance of unrestricted cash at PWB (not including amounts in certain specified accounts) equal to or greater than $10.0 million. The interest rate on Revolving

Line borrowings is a variable annual rate equal to the greater of (a) 2.75% above the Prime Rate (as defined in the Revolving Line), or (b) 6.00%. As of December 31, 2021, the outstanding principal balance on the Revolving Line was $2.5 million.

Funding Requirements

Our operating expenses increased substantially in 2021 and are expected to continue to increase in the short term in connection with the continuation of our current clinical trials and in the long term with planned initiation of additional clinical trials, expected IND and CTA filings, potential BLA filings and expected growth in our *ex vivo* and *in vivo* portfolios.

We believe that, as of the date of this Annual Report on Form 10-K, existing cash and cash equivalents, expected operational receipts and available credit will allow us to fund our operating expense and capital expenditure requirements into mid-2023. We have based these estimates on assumptions that may prove to be imprecise, and we could utilize our available capital resources sooner than we expect. Because of the numerous risks and uncertainties associated with research, development and commercialization of pharmaceutical products, it is difficult to estimate with certainty the amount of our working capital requirements. Our future funding requirements will depend on many factors, including:

- the progress, costs and results of our clinical development for our CD19, CD19B, and BCMA programs as we progress clinical trials, including CRO costs;
- the progress, costs and results of our additional research and preclinical development programs including our *in vivo* pipeline and our planned IND or CTA submissions;
- the outcome, timing and cost of meeting regulatory requirements established by the FDA and other comparable foreign regulatory authorities;
- the costs and timing of internal process development and manufacturing scale-up activities and contract with CMOs associated with our CD19, CD19B, and BCMA programs and other programs we advance through preclinical and clinical development;
- our ability to establish and maintain strategic collaborations, licensing or other agreements and the financial terms of such agreements;
- the scope, progress, results and costs of any product candidates that we may derive from ARCUS or any other product candidates we may develop alone or with collaborators;
- the extent to which we in-license or acquire rights to other products, product candidates or technologies;
- the costs and timing of preparing, filing and prosecuting patent applications, maintaining and protecting our intellectual property rights and defending against any intellectual property-related claims; and
- the costs and timing of future commercialization activities, including product manufacturing, marketing, sales and distribution, for any product candidates for which we or our collaborators obtain marketing approval.

Until such time, if ever, that we can generate product revenue sufficient to achieve profitability, we expect to finance our cash needs through a combination of public or private equity or debt financings, collaboration agreements, other third-party funding, strategic alliances, licensing arrangements and marketing and/or distribution arrangements. See "*Risk Factors – We will need substantial additional funding, and if we are unable to raise a sufficient amount of capital when needed on acceptable terms, or at all, we may be forced to delay, reduce or eliminate some or all of our research programs, product development activities and commercialization efforts.*" in Part I, Item 1A. of this Annual Report on Form 10-K for a further discussion of our ability to generate and obtain adequate amounts of funding in connection with our continuing operations.

To the extent that we raise additional capital through the sale of equity or convertible debt securities, shareholders' ownership interest will be diluted, and the terms of these securities may include liquidation or other preferences that adversely affect the rights of our shareholders. Debt financing and preferred equity financing, if available, may involve agreements that include covenants limiting or restricting our ability to take specific actions, such as incurring additional debt, making capital expenditures or declaring dividends. If we raise additional funds through other third-party funding, collaboration agreements, strategic alliances, licensing arrangements or marketing and distribution arrangements, we may have to relinquish valuable rights to our technologies, future revenue streams, product development and research programs or product candidates or grant licenses on terms that may not be favorable to us. If we are unable to raise additional funds through equity or debt financings when needed, we may be required to delay, limit, reduce or terminate our product development or future commercialization efforts or grant rights to develop and market products or product candidates that we would otherwise prefer to develop and market ourselves.

Contractual Obligations

The following is a summary of our contractual obligations and commitments as of December 31, 2021:

	Payments Due by Period				
(in thousands)	Total	Less Than 1 Year	1-3 Years	3-5 Years	More than 5 Years
Lease Obligations(1)	$ 10,563	$ 2,743	$ 4,929	$ 2,148	$ 743
Revolving Line of Credit(2)	2,727	150	2,577	-	-
Total	$ 13,290	$ 2,893	$ 7,506	$ 2,148	$ 743

(1) Represents future minimum lease payments under our leases for office and/or lab space at the following locations: 302 East Pettigrew Street, Durham, North Carolina expiring in July 2024, and 20 TW Alexander Drive, Research Triangle Park, North Carolina expiring in August 2027. The lease obligations amounts above also represent future minimum lease payments on the MCAT Expansion Space as we are contractually obligated to make such payments on the MCAT Expansion Space notwithstanding that the lease commencement date for accounting purposes was not reached as of December 31, 2021 (see Note 7, "Commitments and Contingencies," to our consolidated financial statements included elsewhere in this Annual Report on Form 10-K for additional information on our lease agreements).

(2) Represents principal and estimated interest payments on our $2.5 million in outstanding Revolving Line borrowings as of December 31, 2021. Under the Revolving Line we may request advances up to an aggregate principal of $30.0 million. The revolving line matures on June 23, 2023 and bears interest at a variable annual rate equal to the greater of (a) 2.75% above the Prime Rate (as defined in the Original Agreement), and (b) 6.00%. As of December 31, 2021, the stated interest rate on the Revolving line was 6.0% and the effective interest rate was 6.8%. If the Revolving Line is terminated prior to the maturity date, we are required to pay an early termination fee equal to $0.6 million. Upon maturity or termination of the revolving line, we are required to pay an amount equal to 1% of the maximum principal amount of the advances outstanding at any time.

We also enter into contracts in the normal course of business with CROs, CMOs, universities and other third parties for preclinical research studies, clinical trials and testing and manufacturing services. These contracts do not contain minimum purchase commitments and are cancelable by us upon prior written notice. Payments due upon cancellation consist only of payments for services provided or expenses incurred, including non-cancelable obligations of our service providers, up to the date of cancellation. These payments are not included in the table above as the amount and timing of such payments are not known.

Critical Accounting Policies and Use of Estimates

Our management's discussion and analysis of financial condition and results of operations is based on our consolidated financial statements, which have been prepared in accordance with accounting principles generally accepted in the United States ("GAAP"). The preparation of our consolidated financial statements and related disclosures requires us to make estimates and assumptions that affect the reported amounts of assets and liabilities, costs and expenses and the disclosure of contingent assets and liabilities in our consolidated financial statements. We base our estimates on historical experience, known trends and events and various other factors that we believe are reasonable under the circumstances, the results of which form the basis for making judgments about the carrying values of assets and liabilities that are not readily apparent from other sources. We evaluate our estimates and assumptions on an ongoing basis. Our actual results may differ from these estimates under different assumptions or conditions.

While our significant accounting policies are described in more detail in the notes to our consolidated financial statements included elsewhere in this Annual Report on Form 10-K, we believe that the following accounting policies are those most critical to the judgments and estimates used in the preparation of our consolidated financial statements.

Revenue Recognition

Our revenues are generated primarily through collaborative research, license, development and commercialization agreements. The terms of these agreements generally contain multiple elements, or deliverables, which may include (1) licenses, or options to obtain licenses, to use our technology, (2) research and development activities to be performed on behalf of the collaborative partner, and (3) in certain cases, services in connection with the manufacturing of preclinical and clinical material. Payments we receive under these arrangements typically include one or more of the following: non-refundable, upfront license fees; option exercise fees; funding of research and/or development efforts; clinical and development, regulatory, and sales milestone payments; and royalties on future product sales. We classify payments received under these agreements as revenues within our consolidated statements of operations.

ASC 606 applies to all contracts with customers, except for contracts that are within the scope of other standards. Under ASC 606, an entity recognizes revenue when its customer obtains control of promised goods or services, in an amount that reflects the consideration which the entity expects to receive in exchange for those goods or services. To determine revenue recognition for arrangements that an entity determines are within the scope of ASC 606, the entity performs the following five steps: (i) identify the contract(s) with a customer; (ii) identify the performance obligations in the contract; (iii) determine the transaction price; (iv) allocate the transaction price to the performance obligations in the contract; and (v) recognize revenue when (or as) the entity satisfies a performance obligation.

At contract inception, once the contract is determined to be within the scope of ASC 606, we evaluate the performance obligations promised in the contract that are based on goods and services that will be transferred to the customer and determine whether those obligations are both (i) capable of being distinct and (ii) distinct in the context of the contract. Goods or services that meet these criteria are considered distinct performance obligations. If both these criteria are not met, the goods and services are combined into a single performance obligation. We then recognize as revenue the amount of the transaction price that is allocated to the respective performance obligation when (or as) the performance obligation is satisfied. Arrangements that include rights to additional goods or services that are exercisable at a customer's discretion are generally considered options. We assess if these options provide a material right to the customer and, if so, these options are considered performance obligations. The exercise of a material right is accounted for as a contract modification for accounting purposes.

We recognize as revenue the amount of the transaction price that is allocated to the respective performance obligation when (or as) each performance obligation is satisfied at a point in time or over time, and if over time this is based on the use of an output or input method.

Invoices issued as stipulated in contracts prior to revenue recognition are recorded as deferred revenue. Amounts expected to be recognized as revenue within the 12 months following the balance sheet date are classified as deferred revenue within current liabilities in our consolidated balance sheets. Amounts not expected to be recognized as revenue within the 12 months following the balance sheet date are classified as noncurrent deferred revenue. Amounts recognized as revenue, but not yet invoiced are generally recognized as contract assets in the other current assets line item in our consolidated balance sheets.

Milestone Payments – If an arrangement includes development and regulatory milestone payments, we evaluate whether the milestones are considered probable of being reached and estimate the amount to be included in the transaction price using the most likely amount method. If it is probable that a significant revenue reversal would not occur, the associated milestone value is included in the transaction price. Milestone payments that are not within our control or the licensee's control, such as regulatory approvals, are generally not considered probable of being achieved until those approvals are received.

Royalties – For arrangements that include sales-based royalties, including milestone payments based on a level of sales, which are the result of a customer-vendor relationship and for which the license is deemed to be the predominant item to which the royalties relate, we recognize revenue at the later of (i) when the related sales occur, or (ii) when the performance obligation to which some or all of the royalty has been allocated has been satisfied or partially satisfied. To date, we have not recognized any royalty revenue resulting from any of our licensing arrangements.

Significant Financing Component – In determining the transaction price, we adjust consideration for the effects of the time value of money if the timing of payments provides us with a significant benefit of financing. We do not assess whether a contract has a significant financing component if the expectation at contract inception is such that the period between payment by the licensees and the transfer of the promised goods or services to the licensees will be one year or less. We assessed each of our revenue arrangements in order to determine whether a significant financing component exists and concluded that a significant financing component does not exist in any of our arrangements.

Collaborative Arrangements – We have entered into collaboration agreements, which are within the scope of ASC 606, to discover, develop, manufacture and commercialize product candidates. The terms of these agreements typically contain multiple promises or obligations, which may include: (1) licenses, or options to obtain licenses, to use our technology, (2) research and development activities to be performed on behalf of the collaboration partner, and (3) in certain cases, services in connection with the manufacturing of preclinical and clinical material. Payments we receive under these arrangements typically include one or more of the following: non-refundable, upfront license fees; option exercise fees; funding of research and/or development efforts; clinical and development, regulatory, and sales milestone payments; and royalties on future product sales.

We analyze our collaboration arrangements to assess whether they are within the scope of ASU No. 2018-18 *Collaborative Arrangements*, or ASC 808, to determine whether such arrangements involve joint operating activities performed by parties that are both active participants in the activities and exposed to significant risks and rewards dependent on the commercial success of such activities. This assessment is performed throughout the life of the arrangement based on changes in the responsibilities of all parties in the arrangement. For collaboration arrangements within the scope of ASC 808 that contain multiple elements, we first determine

which elements of the collaboration are deemed to be within the scope of ASC 808 and those that are more reflective of a vendor-customer relationship and, therefore, are within the scope of ASC 606. For elements of collaboration arrangements that are accounted for pursuant to ASC 808, an appropriate recognition method is determined and applied consistently, generally by analogy to ASC 606. For those elements of the arrangement that are accounted for pursuant to ASC 606, we apply the five-step model described above.

Revenue related to performance obligations satisfied over time could be materially impacted as a result of changes in the estimated research effort to satisfy performance obligations or changes in the transaction price related to variable consideration. For example, in in the year ended December 31, 2021, we recorded cumulative catch up adjustments on that increased revenue recognition by $61.2 million as a result of changes in the transaction price related to variable consideration for development milestones as well as changes in total estimated effort required to satisfy performance obligations. If we were to increase total estimated effort required to satisfy the performance obligations related to the agreement with Lilly by 10%, it would result in a cumulative catch up adjustments that decrease revenue recognition by $1.9 million. Alternatively, if we were to decrease total estimated effort required to satisfy the performance obligations related to the agreement with Lilly by 10%, it would result in a cumulative catch up adjustments that increase revenue recognition by $2.3 million.

Accrued Research and Development Expenses

As part of the process of preparing our consolidated financial statements, we are required to make certain estimates and judgements in our accrued research and development expenses. This process involves reviewing open contracts and purchase orders, communicating with our personnel to identify services that have been performed on our behalf and estimating the level of service performed and the associated costs incurred for the services when we have not yet been invoiced or otherwise notified of the actual costs. The majority of our service providers invoice us in arrears for services performed, on a pre-determined schedule or when contractual milestones are met; however, some require advance payments. We make estimates of our accrued expenses as of each balance sheet date in our consolidated financial statements based on facts and circumstances known to us at that time. Actual costs incurred could differ materially from estimates. Examples of estimated accrued research and development expenses include fees paid to the following:

- CROs and other third parties in connection with performing research and development activities, conducting preclinical studies and clinical trials on our behalf;
- Vendors in connection with preclinical development activities; and
- CMOs and other vendors in connection with product manufacturing and development and distribution of preclinical supplies.

We base our expenses related to preclinical studies on our estimates of the services received and efforts expended pursuant to quotes and contracts with CROs that conduct and manage preclinical studies and clinical trials and CMOs that manufacture product for our research and development activities on our behalf. The financial terms of these agreements are subject to negotiation, vary from contract to contract and may result in uneven payment flows. There may be instances in which payments made to our vendors will exceed the level of services provided and result in a prepayment of the expense. In accruing fees, we estimate the time period over which services will be performed and the level of effort to be expended in each period. If the actual timing of the performance of services or the level of effort varies from our estimate, we adjust the accrual or amount of prepaid expense accordingly.

Share-Based Compensation

We measure stock options and other share-based awards granted to our employees, directors, consultants and advisors based on the fair value on the date of the grant and recognize compensation expense for those awards, net of actual forfeitures, over the requisite service period, which is generally the vesting period of the respective award.

We estimate the fair value of each stock option grant on the date of grant using the Black-Scholes option-pricing model, which uses as inputs the fair value of our common stock and assumptions we make for the expected volatility of our common stock, the expected term of our stock options, the risk-free interest rate for a period that approximates the expected term of our stock options and our expected dividend yield. As we have limited trading history, we estimate our expected volatility based on the historical volatility of publicly traded peer companies and expect to continue to do so until such time as we have adequate historical data regarding the volatility of our traded share price. The expected term of our options has been determined utilizing a weighted value considering actual exercise history and estimated expected term based on the midpoint of final vest date and expiration date. The risk-free interest rate is determined by reference to the U.S. Treasury yield curve in effect at the time of grant of the award for time periods approximately equal to the expected term of the award. Expected dividend yield is based on the fact that we have never paid cash dividends and do not expect to pay any cash dividends in the foreseeable future.

Recent Accounting Pronouncements

A description of recent accounting pronouncements that may potentially impact our financial position, results of operations or cash flows is disclosed in Note 1, “Description of Business and Summary of Significant Accounting Policies,” to our consolidated financial statements included elsewhere in this Annual Report on Form 10-K.

Emerging Growth Company Status

We are an “emerging growth company,” as defined in the JOBS Act, and we may take advantage of reduced reporting requirements that are otherwise applicable to public companies. Section 107 of the JOBS Act exempts emerging growth companies from being required to comply with new or revised financial accounting standards until private companies are required to comply with those standards. We have elected to take advantage of the extended transition period for complying with new or revised accounting standards. As an “emerging growth company,” we are also exempted from having to provide an auditor attestation of internal control over financial reporting under Sarbanes-Oxley Act Section 404(b).

We will remain an “emerging growth company” until the earliest of (1) the last day of the fiscal year in which we have total annual gross revenues of $1.07 billion or more, (2) December 31, 2024, (3) the date on which we have issued more than $1.0 billion in nonconvertible debt during the previous three years or (4) the date on which we are deemed to be a large accelerated filer under the rules of the SEC, which means the market value of our common stock held by non-affiliates exceeds $700 million as of the prior June 30th, we have been a public company for at least 12 months and have filed one Annual Report on Form 10-K.

Item 7A. Quantitative and Qualitative Disclosures About Market Risk.

We are exposed to market risks in the ordinary course of our business. These risks primarily include interest rate sensitivities. Our interest-earning assets consist of cash and cash equivalents, which are denominated in U.S. dollars. We had cash and cash equivalents of $143.7 million, or 68% of our total assets, at December 31, 2021 and $89.8 million, or 60% of our total assets, at December 31, 2020. Interest income earned on these assets was $0.2 million and $0.8 million for the years ended December 31, 2021 and December 31, 2020, respectively. Our interest income is sensitive to changes in the general level of interest rates, primarily U.S. interest rates, however, we do not anticipate fluctuations in interest rates to have a material impact on our financial statements.

We are also exposed to foreign exchange rate risk with respect to foreign currency transactions. We do not anticipate foreign exchange rate risk to have a material impact on our financial statements.

Item 8. Financial Statements and Supplementary Data.

The financial statements required to be filed pursuant to this Item 8 are appended to this report and are incorporated herein by reference. An index of those financial statements is found in Item 15 of Part IV of this Annual Report on Form 10-K.

Item 9. Changes in and Disagreements with Accountants on Accounting and Financial Disclosure.

None.

Item 9A. Controls and Procedures.

Limitations on Effectiveness of Controls and Procedures

In designing and evaluating our disclosure controls and procedures, management recognizes that any controls and procedures, no matter how well designed and operated, can provide only reasonable assurance of achieving the desired control objectives. In addition, the design of disclosure controls and procedures must reflect the fact that there are resource constraints and that management is required to apply judgment in evaluating the benefits of possible controls and procedures relative to their costs.

Evaluation of disclosure controls and procedures

Our management, with the participation of our Chief Executive Officer and Chief Financial Officer, evaluated, as of the end of the period covered by this Annual Report on Form 10-K, the effectiveness of our disclosure controls and procedures (as defined in Rules 13a-15(e) and 15d-15(e) under the Exchange Act). Based on that evaluation, our Chief Executive Officer and Chief Financial Officer concluded that our disclosure controls and procedures were effective at the reasonable assurance level as of December 31, 2021.

Management's annual report on internal control over financial reporting

Our management, with the participation of our principal executive officer and our principal financial officer, is responsible for establishing and maintaining adequate internal control over financial reporting as defined in Rules 13a-15(f) and 15d-15(f) under the Exchange Act. Our management conducted an assessment of the effectiveness of our internal control over financial reporting based on the criteria set forth in "Internal Control–Integrated Framework (2013)" issued by the Committee of Sponsoring Organizations of the Treadway Commission. Based on this assessment, management concluded that, as of December 31, 2021, our internal control over financial reporting was effective.

Attestation Report of the Registered Public Accounting Firm

Our independent registered accounting firm will not be required to opine on the effectiveness of our internal control over financial reporting pursuant to Section 404 of Sarbanes-Oxley Act of 2002 until we are no longer an "emerging growth company" as defined in the JOBS Act.

Changes in internal control over financial reporting

There were no changes in our internal control over financial reporting (as defined in Rules 13a-15(f) and 15d-15(f) under the Exchange Act) during the quarter ended December 31, 2021 that have materially affected, or are reasonably likely to materially affect, our internal control over financial reporting.

Item 9B. Other Information.

None.

Item 9C. Disclosure Regarding Foreign Jurisdictions that Prevent Inspections.

None.

PART III

Item 10. Directors, Executive Officers and Corporate Governance.

The information required by this item will be included in our definitive proxy statement (or the "2022 Proxy Statement") to be filed with the SEC within 120 days of the end of our fiscal year covered by this Annual Report on Form 10-K and is incorporated herein by reference.

Item 11. Executive Compensation.

The information required by this item will be included in our 2022 Proxy Statement to be filed with the SEC within 120 days of the end of our fiscal year covered by this Annual Report on Form 10-K and is incorporated herein by reference.

Item 12. Security Ownership of Certain Beneficial Owners and Management and Related Stockholder Matters.

The information required by this item will be included in our 2022 Proxy Statement to be filed with the SEC within 120 days of the end of our fiscal year covered by this Annual Report on Form 10-K and is incorporated herein by reference.

Item 13. Certain Relationships and Related Transactions, and Director Independence.

The information required by this item will be included in our 2022 Proxy Statement to be filed with the SEC within 120 days of the end of our fiscal year covered by this Annual Report on Form 10-K and is incorporated herein by reference.

Item 14. Principal Accountant Fees and Services.

The information required by this item will be included in our 2022 Proxy Statement to be filed with the SEC within 120 days of the end of our fiscal year covered by this Annual Report on Form 10-K and is incorporated herein by reference.

PART IV

Item 15. Exhibits and Financial Statement Schedules.

(a)(1) Financial Statements

The following documents are included on pages F-1 through F-26 attached hereto and are filed as part of this Annual Report on Form 10-K.

INDEX TO CONSOLIDATED FINANCIAL STATEMENTS

(a)(2) Financial Statement Schedules

All financial statement schedules have been omitted because they are not applicable, not required or the information required is shown in the financial statements or the notes thereto.

(a)(3) Exhibits

The following is a list of exhibits filed, furnished or incorporated by reference as part of this Annual Report on Form 10-K.

Exhibit Index

Exhibit Number	Description	Form	File No.	Exhibit	Filing Date	Filed Herewith
3.1	Amended and Restated Certificate of Incorporation of Precision BioSciences, Inc.	8-K	001-38841	3.1	4/1/2019	
3.2	Amended and Restated Bylaws of Precision BioSciences, Inc.	10-Q	001-38841	3.2	11/10/2020	
4.1	Specimen Common Stock Certificate	S-1/A	333-230034	4.1	3/18/2019	
4.2	Amended and Restated Investors' Rights Agreement among Precision BioSciences, Inc. and certain of its stockholders and the holders of the 2019 Notes, dated May 25, 2018, as amended	S-1/A	333-230034	4.2	3/18/2019	
4.3	Amendment No. 2, dated February 3, 2020, to the Amended and Restated Investors' Rights Agreement among Precision BioSciences, Inc. and certain of its stockholders and the holders of the 2019 Notes, dated May 25, 2018, as amended	8-K	001-38841	10.1	2/6/2020	
4.4	Form of Indenture.	S-3	333-238857	4.3	6/1/2020	
4.5	Description of the Registrant's Securities					*
10.1††	Loan and Security Agreement, dated May 15, 2019, among Precision BioSciences, Inc., Elo Life Systems, Inc. and Pacific Western Bank, as amended					*
10.2†	Development and Commercial License Agreement by and between Les Laboratoires Servier and Precision BioSciences, Inc., dated February 24, 2016, as amended	S-1	333-230034	10.1	3/1/2019	
10.3††	Amendment No. 5, dated September 18, 2019, to Development and Commercial License Agreement by and between Les Laboratoires Servier and Precision BioSciences, Inc., dated February 24, 2016, as amended	10-Q	001-38841	10.2	11/12/2019	
10.4††	Amendment No. 6, dated October 16, 2020, to Development and Commercial License Agreement by and between Les Laboratoires Servier, Institut de Recherches Internationales Servier and Precision BioSciences, Inc., dated February 24, 2016, as amended	10-Q	001-38841	10.2	11/10/2020	
10.5††	Program Purchase Agreement by and among Les Laboratoires Servier, Institut de Recherches Internationales Servier, and Precision BioSciences, Inc., dated April 9, 2021	10-Q	001-38841	10.1	5/13/2021	
10.6††	Development and License Agreement between Eli Lilly and Company and Precision BioSciences, Inc., dated November 19, 2020	10-K	001-38841	10.5	3/18/2021	
10.7††	First Amendment to Development and License Agreement between Precision BioSciences, Inc. and Eli Lilly and Company, dated August 9, 2021	10-Q	001-38841	10.2	11/10/21	
10.8	Stock Purchase Agreement between Eli Lilly and Company and Precision BioSciences, Inc., dated November 19, 2020	10-K	001-38841	10.6	3/18/2021	
10.9†	License Agreement by and between Duke University and Precision BioSciences, Inc., dated April 17, 2006, as amended	S-1	333-230034	10.2	3/1/2019	
10.10†	Patent Cross-License Agreement by and between Cellectis SA and Precision BioSciences, Inc., dated January 23, 2014	S-1	333-230034	10.3	3/1/2019	
10.11	Lease Agreement between Precision BioSciences, Inc. and Venable Tenant, LLC, dated April 5, 2010, as amended	10-K	001-38841	10.9	3/18/2021	
10.12	Lease Agreement between Precision BioSciences, Inc. and Durham TW Alexander, LLC, dated October 2, 2018, as amended					*

Exhibit Number	Description	Form	File No.	Exhibit	Filing Date	Filed Herewith
10.13#	2006 Stock Incentive Plan, as amended, and form of award agreements thereunder	S-1	333-230034	10.8	3/1/2019	
10.14#	2015 Stock Incentive Plan, as amended, and form of award agreements thereunder	S-1	333-230034	10.9	3/1/2019	
10.15#	2019 Incentive Award Plan, and forms of award agreements thereunder	10-K	001-38841	10.14	3/18/2021	
10.16#	2019 Employee Stock Purchase Plan	S-1/A	333-230034	10.11	3/18/2019	
10.17#	2021 Employment Inducement Incentive Award Plan and form of award agreements thereunder	S-8	333-259369	99.3	9/7/2021	
10.18#	Amended and Restated Executive Employment Agreement between Precision BioSciences, Inc. and Derek Jantz, dated February 27, 2019	S-1/A	333-230034	10.13	3/18/2019	
10.19#	Executive Employment Agreement between Precision BioSciences, Inc. and Dario Scimeca dated April 11, 2019	10-K	001-38841	10.22	3/10/2020	
10.20#	Form of Indemnification Agreement between Precision BioSciences, Inc. and its directors and officers	S-1A	333-230034	10.17	3/18/2019	
10.21#	Non-Employee Director Compensation Plan (as amended)	10-Q	001-38841	10.4	5/13/2021	
10.22#	Transition and Separation Agreement between Precision BioSciences, Inc. and Matthew Kane, dated April 5, 2021	8-K	001-38841	10.1	4/6/2021	
10.23#	Executive Employment Agreement between Precision BioSciences, Inc. and Dr. Alan List, dated April 26, 2021	10-Q	001-38841	10.2	5/13/2021	
10.24#	Consulting Agreement between Precision BioSciences, Inc. and Dr. Chris Heery, dated April 23, 2021	10-Q	001-38841	10.3	5/13/2021	
10.25#	Amended and Restated Executive Employment Agreement between Precision BioSciences, Inc. and Alex Kelly, dated May 27, 2021	10-Q	001-38841	10.5	8/12/2021	
10.26#	Executive Employment Agreement, dated September 18, 2021, by and between Michael Amoroso and Precision Biosciences, Inc	8-K	001-38841	10.1	9/27/2021	
10.27#	Consulting Agreement between Precision BioSciences, Inc. and Dr. David Thomson, dated July 2, 2021.	10-Q	001-38841	10.4	11/10/2021	
21.1	Subsidiaries of Precision BioSciences, Inc.					*
23.1	Consent of Deloitte & Touche LLP					*
31.1	Certification of Principal Executive Officer Pursuant to Rules 13a-14(a) and 15d-14(a) under the Securities Exchange Act of 1934, as Adopted Pursuant to Section 302 of the Sarbanes-Oxley Act of 2002.					*
31.2	Certification of Principal Financial Officer Pursuant to Rules 13a-14(a) and 15d-14(a) under the Securities Exchange Act of 1934, as Adopted Pursuant to Section 302 of the Sarbanes-Oxley Act of 2002.					*
32.1	Certification of Principal Executive Officer Pursuant to 18 U.S.C. Section 1350, as Adopted Pursuant to Section 906 of the Sarbanes-Oxley Act of 2002.					**
32.2	Certification of Principal Financial Officer Pursuant to 18 U.S.C. Section 1350, as Adopted Pursuant to Section 906 of the Sarbanes-Oxley Act of 2002.					**

Exhibit Number	Description	Form	File No.	Exhibit	Filing Date	Filed Herewith
101.INS	XBRL Instance Document					*
101.SCH	XBRL Taxonomy Extension Schema Document					*
101.CAL	XBRL Taxonomy Extension Calculation Linkbase Document					*
101.DEF	XBRL Taxonomy Extension Definition Linkbase Document					*
101.LAB	XBRL Taxonomy Extension Label Linkbase Document					*
101.PRE	XBRL Taxonomy Extension Presentation Linkbase Document					*
104	Cover Page Interactive Data File (as formatted as Inline XBRL and contained in Exhibit 101)					*

* Filed herewith
** Furnished herewith
† Confidential treatment of certain provisions has been granted by the SEC pursuant to Rule 406 under the Securities Act of 1933, as amended.
†† Portions of this exhibit have been omitted pursuant to Item 601(b)(10)(iv) of Regulation S-K.
# Denotes a management contract or compensatory plan or arrangement

Item 16. Form 10-K Summary.

None.

SIGNATURES

Pursuant to the requirements of Section 13 or 15(d) of the Securities Exchange Act of 1934, as amended, the Registrant has duly caused this Report to be signed on its behalf by the undersigned, thereunto duly authorized**.**

Precision BioSciences, Inc.

Date: March 15, 2022

By: /s/ Michael Amoroso

Michael Amoroso
President, Chief Executive Officer and Director
(principal executive office and authorized signatory)

Date: March 15, 2022

By: /s/ John Alexander Kelly

John Alexander Kelly
Chief Financial Officer
(principal financial officer)

Pursuant to the requirements of the Securities Exchange Act of 1934, as amended, this Report has been signed below by the following persons on behalf of the Registrant in the capacities and on the dates indicated.

Name	Title	Date
/s/ Michael Amoroso **Michael Amoroso**	President, Chief Executive Officer and Director (*principal executive officer*)	March 15, 2022
/s/ John Alexander Kelly **John Alexander Kelly**	Chief Financial Officer (*principal financial officer*)	March 15, 2022
/s/ Shane Barton **Shane Barton**	Vice President and Corporate Controller (*principal accounting officer)*	March 15, 2022
/s/ Derek Jantz **Derek Jantz, Ph.D.**	Chief Scientific Officer and Director	March 15, 2022
/s/ Raymond Schinazi **Raymond Schinazi, Ph.D., DSc**	Director	March 15, 2022
/s/ Shalini Sharp **Shalini Sharp**	Director	March 15, 2022
/s/ Kevin Buehler **Kevin Buehler**	Director	March 15, 2022
/s/ Geno Germano **Geno Germano**	Director	March 15, 2022
/s/ Stanley Frankel **Stanley Frankel, M.D.**	Director	March 15, 2022
/s/ Shari Lisa Piré **Shari Lisa Piré, J.D.**	Director	March 15, 2022
/s/ Sam Wadsworth **Sam Wadsworth, Ph.D.**	Director	March 15, 2022

REPORT OF INDEPENDENT REGISTERED PUBLIC ACCOUNTING FIRM

To the stockholders and the Board of Directors of Precision BioSciences, Inc.

Opinion on the Financial Statements

We have audited the accompanying consolidated balance sheets of Precision BioSciences, Inc. and subsidiaries (the "Company") as of December 31, 2021 and 2020, the related consolidated statements of operations, changes in stockholders' equity, and cash flows, for each of the two years in the period ended December 31, 2021, and the related notes (collectively referred to as the "financial statements"). In our opinion, the financial statements present fairly, in all material respects, the financial position of the Company as of December 31, 2021 and 2020, and the results of its operations and its cash flows for each of the two years in the period ended December 31, 2021, in conformity with accounting principles generally accepted in the United States of America.

Basis for Opinion

These financial statements are the responsibility of the Company's management. Our responsibility is to express an opinion on the Company's financial statements based on our audits. We are a public accounting firm registered with the Public Company Accounting Oversight Board (United States) (PCAOB) and are required to be independent with respect to the Company in accordance with the U.S. federal securities laws and the applicable rules and regulations of the Securities and Exchange Commission and the PCAOB.

We conducted our audits in accordance with the standards of the PCAOB. Those standards require that we plan and perform the audit to obtain reasonable assurance about whether the financial statements are free of material misstatement, whether due to error or fraud. The Company is not required to have, nor were we engaged to perform, an audit of its internal control over financial reporting. As part of our audits, we are required to obtain an understanding of internal control over financial reporting but not for the purpose of expressing an opinion on the effectiveness of the Company's internal control over financial reporting. Accordingly, we express no such opinion.

Our audits included performing procedures to assess the risks of material misstatement of the financial statements, whether due to error or fraud, and performing procedures that respond to those risks. Such procedures included examining, on a test basis, evidence regarding the amounts and disclosures in the financial statements. Our audits also included evaluating the accounting principles used and significant estimates made by management, as well as evaluating the overall presentation of the financial statements. We believe that our audits provide a reasonable basis for our opinion.

/s/ Deloitte & Touche LLP

Raleigh, North Carolina

March 15, 2022

We have served as the Company's auditor since 2017.

PART I. FINANCIAL INFORMATION

Item 1. Financial Statements.

PRECISION BIOSCIENCES, INC.
CONSOLIDATED BALANCE SHEETS
(In thousands, except share and per share amounts)

	December 31, 2021	December 31, 2020
Assets		
Current assets:		
Cash and cash equivalents	$ 143,663	$ 89,798
Accounts receivable	488	10,000
Prepaid expenses	17,434	5,762
Other current assets	169	4
Total current assets	161,754	105,564
Property, equipment, and software—net	25,154	35,090
Intangible assets—net	2,048	1,373
Right-of-use assets—net	4,180	6,410
Investment in equity securities	3,091	—
Equity method investments	3,751	—
Note receivable—net	6,879	—
Other assets	4,641	1,721
Total assets	$ 211,498	$ 150,158
Liabilities and Stockholders' Equity		
Current liabilities:		
Accounts payable	$ 1,144	$ 792
Accrued compensation	6,765	5,745
Accrued clinical research and development expenses	4,028	3,269
Deferred revenue	21,244	30,236
Lease liabilities	1,822	1,933
Other current liabilities	977	854
Total current liabilities	35,980	42,829
Deferred revenue	67,015	53,926
Lease liabilities	4,813	8,586
Long term debt—net	2,478	—
Contract liabilities	10,000	—
Other noncurrent liabilities	44	392
Total liabilities	120,330	105,733
Stockholders' equity:		
Preferred stock, $0.0001 par value— 10,000,000 shares authorized as of December 31, 2021 and December 31, 2020; no shares issued and outstanding as of December 31, 2021 and December 31, 2020	—	—
Common stock; $0.000005 par value— 200,000,000 shares authorized, 61,712,577 shares issued and 60,902,105 shares outstanding as of December 31, 2021; 53,503,124 shares issued and 52,692,652 shares outstanding as of December 31, 2020	—	—
Additional paid-in capital	408,795	331,450
Accumulated deficit	(316,675)	(286,073)
Treasury stock	(952)	(952)
Total stockholders' equity	91,168	44,425
Total liabilities and stockholders' equity	$ 211,498	$ 150,158

See notes to consolidated financial statements

PRECISION BIOSCIENCES, INC.
CONSOLIDATED STATEMENTS OF OPERATIONS
(In thousands, except share and per share amounts)

	For the Years Ended December 31,	
	2021	2020
Revenue	$ 115,529	$ 24,285
Operating expenses		
Research and development	115,238	98,061
General and administrative	39,693	36,052
Total operating expenses	154,931	134,113
Loss from operations	(39,402)	(109,828)
Other income (expense), net:		
Gain on changes in fair value	2,555	—
Gain on deconsolidation of subsidiary	5,985	—
Income from equity method investments	184	—
Interest expense	(132)	—
Interest income	208	822
Total other income (expense), net	8,800	822
Net loss and net loss attributable to common stockholders	$ (30,602)	$ (109,006)
Net loss per share attributable to common stockholders-basic and diluted	$ (0.52)	$ (2.09)
Weighted average shares of common stock outstanding-basic and diluted	58,688,102	52,031,740

See notes to consolidated financial statements

PRECISION BIOSCIENCES, INC.
CONSOLIDATED STATEMENTS OF CHANGES IN STOCKHOLDERS' EQUITY
(In thousands, except share amounts)

	Common Stock		Additional Paid-In	Accumulated	Treasury	Total Stockholder's
	Shares	Amount	Capital	Deficit	Stock	Equity
Balance- January 1, 2020	51,965,708	$ —	$ 316,333	$ (177,067)	$ (952)	$ 138,314
Stock option exercises	1,411,188	—	691	—	—	$ 691
Issuance of common stock under employee stock purchase plan	126,228	—	640	—	—	$ 640
Share-based compensation expense	—	—	13,786	—	—	$ 13,786
Net loss	—	—	—	(109,006)	—	$ (109,006)
Balance- December 31, 2020	53,503,124	—	331,450	(286,073)	(952)	44,425
Stock option exercises	1,997,700	—	6,783	—	—	6,783
Issuance of common stock under employee stock purchase plan	126,887	—	804	—	—	804
Share-based compensation expense	—	—	16,514	—	—	16,514
Issuance of common stock to collaboration partners	3,762,190	—	27,739	—	—	27,739
Proceeds from issuance of common stock, net of issuance cost	2,322,676	—	25,505	—	—	25,505
Net loss	—	—	—	(30,602)	—	(30,602)
Balance- December 31, 2021	61,712,577	$ —	$ 408,795	$ (316,675)	$ (952)	$ 91,168

See notes to consolidated financial statements

PRECISION BIOSCIENCES, INC.
CONSOLIDATED STATEMENTS OF CASH FLOWS
(In thousands)

	For the Years Ended December 31,	
	2021	2020
Cash flows from operating activities:		
Net loss	$ (30,602)	$ (109,006)
Adjustments to reconcile net loss to net cash used in operating activities:		
Depreciation and amortization	8,981	8,777
Share-based compensation	16,514	13,786
Loss on disposal of assets	26	35
Non-cash interest expense	59	—
Amortization of right-of-use assets	1,216	1,036
Non-cash consideration received from collaboration partners	(17,894)	—
Gain on changes in fair value	(2,555)	—
Gain on deconsolidation of subsidiary	(5,985)	—
Income from equity method investments	(184)	—
Amortization of discount on note receivable	(13)	—
Changes in operating assets and liabilities:		
Prepaid expenses	5,616	3,735
Accounts receivable	9,512	(9,035)
Other assets and other current assets	(2,734)	2,194
Accounts payable	867	(1,455)
Other liabilities and other current liabilities	1,423	2,475
Deferred revenue	(3,164)	1,781
Lease liabilities and right-of-use assets	(1,936)	(1,709)
Contract liabilities	10,000	—
Net cash used in operating activities	(10,853)	(87,386)
Cash flows from investing activities:		
Purchases of property, equipment and software	(5,053)	(5,031)
Purchases of intangibles assets	(750)	—
Net cash used in investing activities	(5,803)	(5,031)
Cash flows from financing activities:		
Proceeds from stock option exercises	6,783	689
Proceeds from employee stock purchase plan	804	640
Proceeds from issuance of common stock to collaboration partners	35,000	—
Proceeds from offering of common stock, net of issuance costs	25,477	—
Proceeds from issuance of term loan, net of issuance costs paid to lender	2,465	—
Debt issuance costs	(13)	—
Payment of term loan	(2,500)	—
Borrowings from revolving credit facility	2,505	—
Net cash provided by financing activities	70,521	1,329
Net increase (decrease) in cash and cash equivalents	53,865	(91,088)
Cash and cash equivalents—beginning of period	89,798	180,886
Cash and cash equivalents —end of period	$ 143,663	$ 89,798
Supplemental disclosures of noncash financing and investing activities:		
Property, equipment and software additions included in accounts payable, accrued expenses and other current liabilities	$ 103	$ 665
Unsettled at-the-market issuances of common stock included in other current assets	$ 37	$ —
Contract liability accrual related to Servier Program Purchase Agreement milestones	$ 10,000	$ —
Non-cash consideration received from collaboration partners	$ 17,894	$ —

See notes to consolidated financial statements

NOTE 1: DESCRIPTION OF BUSINESS AND SUMMARY OF SIGNIFICANT ACCOUNTING POLICIES

Description of Business

Precision BioSciences, Inc. (the "Company") was incorporated on January 26, 2006 under the laws of the State of Delaware and is based in Durham, North Carolina. The Company is a clinical stage gene editing company dedicated to improving life by developing *ex vivo* allogeneic CAR T immunotherapies and *in vivo* therapies for genetic and infectious diseases with the application of the Company's wholly owned proprietary ARCUS genome editing platform.

The Company's 100% owned subsidiary, Precision PlantSciences, Inc., was incorporated on January 4, 2012. Precision PlantSciences, Inc. amended its certificate of incorporation on January 16, 2018 to change its name to Elo Life Systems, Inc. In December 2021, the Company entered into an agreement with a syndicate of investors, pursuant to which the Company contributed substantially all of the assets of Elo Life Systems, Inc. to New Elo. In connection with the Elo Transaction, Elo Life Systems, Inc. amended its certificate of incorporation on December 21, 2021 to change its name back to Precision PlantSciences, Inc. in order to permit a newly formed entity ("New Elo") to change its name to Elo Life Systems, Inc.

The Company's 100% owned subsidiary, Precision BioSciences UK Limited, was incorporated on June 17, 2019. The accompanying consolidated financial statements include the accounts of the Company and its subsidiary. Intercompany balances and transactions have been eliminated in consolidation.

Since its inception, the Company has devoted substantially all of its efforts to research and development activities, recruiting skilled personnel, developing manufacturing processes, establishing its intellectual property portfolio and providing general and administrative support for these operations. The Company is subject to a number of risks similar to those of other companies conducting high-risk, early-stage research and development of product candidates. Principal among these risks are dependence on key individuals and intellectual property, competition from other products and companies, and the technical risks associated with the successful research, development and clinical manufacturing of its product candidates. The Company's success is dependent upon its ability to continue to raise additional capital in order to fund ongoing research and development, obtain regulatory approval of its products, successfully commercialize its products, generate revenue, meet its obligations, and, ultimately, attain profitable operations.

Use of Estimates

The preparation of consolidated financial statements in conformity with accounting principles generally accepted in the United States of America ("GAAP") requires management to make estimates and assumptions that affect the amounts reported in the consolidated financial statements and disclosures made in the accompanying notes to the consolidated financial statements. Actual results could differ from those estimates. Significant estimates include recording revenue for performance obligations recognized over time, determination of the fair value of share-based compensation grants and estimating services expended by third-party service providers used to recognize research and development expense.

Basis of Presentation

These financial statements have been prepared in accordance with GAAP. Additionally, the accompanying consolidated financial statements have been prepared on a going concern basis, which contemplates the realization of assets and the satisfaction of liabilities in the normal course of business. As of December 31, 2021, the Company has not generated any revenue from product sales and does not expect to generate any revenue from the sale of product in the foreseeable future. During the year ended December 31, 2021, the Company incurred a net loss of $30.6 million and, as of December 31, 2021, has an accumulated deficit of $316.7 million. The Company has financed its operations primarily through proceeds from upfront and milestone payments from collaboration and licensing agreements, the Company's IPO, private placements of convertible preferred stock and convertible debt financings, at-the-market offerings of common stock, and borrowings on credit facilities. The Company expects to incur additional operating losses and negative operating cash flows for the foreseeable future.

Management believes that, as of the date of this Annual Report on Form 10-K, existing cash and cash equivalents, expected operational receipts and available credit will allow the Company to fund its operating expense and capital expenditure requirements into mid-2023. In the absence of a significant source of recurring revenue, the continued viability of the Company beyond that point is dependent on its ability to continue to raise additional capital to finance its operations. There can be no assurance that the Company will be able to obtain sufficient capital to cover its costs on acceptable terms, if at all.

Summary of Significant Accounting Policies

Cash and Cash Equivalents

The Company considers all highly liquid investments with an original maturity of three months or less at the date of purchase to be cash equivalents. As of December 31, 2021 and December 31, 2020, the Company held an insignificant amount of cash equivalents.

Concentrations of Credit Risk

Financial instruments that potentially subject the Company to concentrations of credit risk consist principally of cash and notes receivable. All of the Company's cash and cash equivalents are held at financial institutions that management believes to be of high credit quality. The Company may maintain cash deposits in financial institutions in excess of government insured limits. The Company regularly invests excess cash deposits in money market funds and repurchase agreements. The Company believes that the credit risk arising from the holdings of these financial instruments is mitigated by the fact that these securities are of short duration, government backed and of high credit rating. The Company has not experienced any losses on cash and cash equivalents to date.

Revenue from Lilly and Servier accounted for 18% and 63% of revenue during 2021, respectively. Revenue from Gilead and Servier accounted for 16% and 74% of revenue during 2020, respectively. Lilly accounted for 100% of deferred revenue as of December 31, 2021.

Property, Equipment and Software

Property, equipment and software are stated at cost, net of depreciation and amortization. Depreciation and amortization are calculated using the straight-line method over the estimated useful lives of the assets ranging from three to seven years. Leasehold improvements are amortized on a straight-line basis over the shorter of the lease term or estimated useful life of the asset.

The depreciation and amortization periods for the Company's significant property, equipment and software categories are as follows:

Laboratory equipment	5 to 7 years
Furniture and fixtures and office equipment	3 to 5 years
Leasehold improvements	Lesser of remaining lease term or useful life

Repairs and maintenance are charged to operations as incurred, and expenditures for additions and improvements that extend the useful life of the asset are capitalized.

Intangible Assets

Intangible assets primarily include licenses and patents. The Company capitalizes license fees paid to acquire access to proprietary technology if the technology is expected to have alternative future use in multiple research and development projects. The cost of licensed technology rights is amortized using the straight-line method over the estimated useful life of the technology. If the access to use the technology rights is one year or less, the cost is recorded as a prepaid expense and amortized over the period identified in the agreement. Amortization expense for licensed technology and capitalized patent costs is included in research and development expenses within the accompanying consolidated statement of operations.

Impairment of Long-Lived Assets

Long-lived assets, such as property, equipment and software and intangible assets, subject to amortization, are reviewed for impairment whenever events or changes in circumstances indicate that the carrying amount of an asset may not be recoverable. An impairment loss is assessed when future undiscounted cash flows are less than the assets' carrying value and recognized when the carrying value of the asset exceeds fair value. Fair value is calculated by estimating the discounted future cash flows expected to be generated by the asset as well as other valuation techniques. An impairment charge is recognized for the amount by which the carrying amount exceeds the fair value of the asset.

Fair Value Measurements

Fair value is defined as the price that would be received from selling an asset or paid to transfer a liability in an orderly transaction between market participants at the measurement date. When determining the fair value measurements for assets and liabilities, which are required to be recorded at fair value, we consider the principal or most advantageous market in which we would transact and the market-based risk measurements or assumptions that market participants would use in pricing the asset or liability, such as risks inherent in valuation techniques, transfer restrictions and credit risk. ASC 820, *Fair Value Measurement*, establishes a fair value hierarchy for instruments measured at fair value that distinguishes between assumptions based on market data (observable inputs) and

the Company's assumptions (unobservable inputs). Observable inputs are inputs that market participants would use in pricing the asset or liability based on market data obtained from our independent sources. Unobservable inputs are inputs that reflect the Company's assumptions about the inputs that market participants would use in pricing the asset or liability, and are developed based on the best information available in the circumstances. The following fair value hierarchy is used to classify assets and liabilities based on the observable inputs and unobservable inputs used to value the assets and liabilities:

- Level 1 - Observable inputs based on unadjusted quoted prices in active markets for identical assets or liabilities
- Level 2 - Inputs, other than quoted prices in active markets, that are observable either directly or indirectly
- Level 3 - Unobservable inputs for which there is little or no market date, which require the Company to develop its own assumptions

To the extent that the valuation is based on models or inputs that are less observable or unobservable in the market, the determination of fair value requires more judgment. A financial instrument's level within the fair value hierarchy is based on the lowest level of any input that is significant to the fair value measurement.

The Company's cash equivalents are reported at fair value within Level 1 as the prices are available from quoted prices in active markets. The Company's equity investment in iECURE is reported at fair value within Level 3 as the assessed fair value was based on significant unobservable inputs given iECURE equity is not traded on a public exchange.

Investments in Equity Securities

The Company carries investments in equity securities for which it does not possess the ability to exercise significant influence or control at fair value in the consolidated balance sheets and records changes in fair value in the consolidated statements of operations as a component of other income or expense.

As of December 31, 2021, the Company held common stock in iECURE with a fair value of $3.1 million. As of December 31, 2020, the Company did not hold any investments in equity securities.

Investments under the Equity Method

The Company utilizes the equity method to account for investments when it is determined that the Company possess the ability to exercise significant influence, but not control, over the operating and financial policies of the investee. The ability to exercise significant influence is presumed when the investor possesses more than 20% of the voting interests of the investee. This presumption may be overcome based on specific facts and circumstances that demonstrate that the ability to exercise significant influence is restricted.

In applying the equity method, the Company will subsequently increase or decrease the carrying amount of the investment by the Company's proportionate share of the net earnings or losses and other comprehensive income of the investee. In the event that net losses of the investee reduce the carrying amount to zero, additional net losses may be recorded if other investments in the investee are at-risk, even if the Company has not committed to provide financial support to the investee. Such additional equity method losses, if any, are based upon the change in the Company's claim on the investee's book value.

As of December 31, 2021, the Company accounted for its investment in New Elo under the equity method. The Company will subsequently increase or decrease the carrying amount of the investment in New Elo by the Company's proportionate share of the net earnings or losses and other comprehensive income of New Elo.

Leases

In February 2016, the Financial Accounting Standards Board ("FASB") issued Accounting Standards Update ("ASU") 2016-02, *Leases* ("ASC 842"), to enhance the transparency and comparability of financial reporting related to leasing arrangements. The Company adopted ASC 842 on January 1, 2020, or the effective date, and used the effective date as its date of initial application.

At the inception of an arrangement, the Company determines whether the arrangement is or contains a lease based on the unique facts and circumstances present. Leases with a term greater than one year are recognized on the balance sheet as right-of-use assets and lease liabilities. The Company has elected not to recognize on the balance sheet leases with terms of one year or less. Lease liabilities and corresponding right-of-use assets are recorded based on the present value of lease payments over the expected remaining lease term. Certain adjustments to the right-of-use asset were required for items such as prepaid and deferred rent. In calculating the present value of the lease payments, the Company has elected to apply the discount rate based on the remaining lease term as of the transition

date, January 1, 2020. As the rate implicit in the lease is not readily determinable, the Company utilizes its incremental borrowing rates, which are the rates incurred to borrow on a collateralized basis over a similar term an amount equal to the lease payments in a similar economic environment.

The Company has elected to account for the lease and non-lease components of each of its operating leases as a single lease component. In addition, the Company elected the package of practical expedients permitted under the transition guidance within ASC 842, in which the Company need not reassess (i) the historical lease classification, (ii) whether any expired or existing contract is or contains a lease, or (iii) the initial direct costs for any existing leases. The operating right-of-use asset recorded on the balance sheet is amortized on a straight-line basis as lease expense.

Revenue Recognition for Contracts with Customers

The Company's revenues are generated primarily through collaborative research, license, development and commercialization agreements.

ASC 606 applies to all contracts with customers, except for contracts that are within the scope of other standards. Under ASC 606, an entity recognizes revenue when its customer obtains control of promised goods or services, in an amount that reflects the consideration which the entity expects to receive in exchange for those goods or services. To determine revenue recognition for arrangements that an entity determines are within the scope of ASC 606, the entity performs the following five steps: (i) identify the contract(s) with a customer; (ii) identify the performance obligations in the contract; (iii) determine the transaction price; (iv) allocate the transaction price to the performance obligations in the contract; and (v) recognize revenue when (or as) the entity satisfies a performance obligation.

At contract inception, once the contract is determined to be within the scope of ASC 606, the Company evaluates the performance obligations promised in the contract that are based on goods and services that will be transferred to the customer and determines whether those obligations are both (i) capable of being distinct and (ii) distinct in the context of the contract. Goods or services that meet these criteria are considered distinct performance obligations. If both these criteria are not met, the goods and services are combined into a single performance obligation. The Company then recognizes as revenue the amount of the transaction price that is allocated to the respective performance obligation when (or as) the performance obligation is satisfied. Arrangements that include rights to additional goods or services that are exercisable at a customer's discretion are generally considered options. The Company assesses if these options provide a material right to the customer and if so, these options are considered performance obligations. The exercise of a material right is accounted for as a contract modification for accounting purposes.

The Company recognizes as revenue the amount of the transaction price that is allocated to the respective performance obligation when (or as) each performance obligation is satisfied at a point in time or over time, and if over time this is based on the use of an output or input method. For the year ended December 31, 2021, the Company recorded cumulative catch up adjustments on its contracts with customers that increased revenue recognition by $61.2 million; the cumulative catch-up adjustments resulted from a change in the transaction price related to variable consideration for development milestones as well as changes in total estimated effort required to satisfy performance obligations. During the year ended December 31, 2021, the Company recorded $74.2 million in revenue that was included in deferred revenue as of December 31, 2020.

Invoices issued as stipulated in contracts prior to revenue recognition are recorded as deferred revenue. Amounts expected to be recognized as revenue within the 12 months following the balance sheet date are classified as deferred revenue within current liabilities in the accompanying consolidated balance sheets. Amounts not expected to be recognized as revenue within the 12 months following the balance sheet date are classified as noncurrent deferred revenue. Amounts recognized as revenue, but not yet invoiced are generally recognized as contract assets in the other current assets line item in the accompanying consolidated balance sheets.

Milestone Payments – If an arrangement includes development and regulatory milestone payments, the Company evaluates whether the milestones are considered probable of being reached and estimates the amount to be included in the transaction price using the most likely amount method. If it is probable that a significant revenue reversal would not occur, the associated milestone value is included in the transaction price. Milestone payments that are not within the Company's or the licensee's control, such as regulatory approvals, are not considered probable of being achieved until those approvals are received and therefore revenue recognized is constrained as management is unable to assert that a reversal of revenue would not be probable. The transaction price is then allocated to each performance obligation on a relative standalone selling price basis, for which the Company recognizes revenue as or when the performance obligations under the contract are satisfied. At the end of each subsequent reporting period, the Company re-evaluates the probability of achievement of such development milestones and any related constraint, and, if necessary, adjusts its estimate of the overall transaction price. Any such adjustments are recorded on a cumulative catch-up basis, which would affect collaboration revenues and earnings in the period of adjustment.

Royalties – For arrangements that include sales-based royalties, including milestone payments based on a level of sales, which are the result of a customer-vendor relationship and for which the license is deemed to be the predominant item to which the royalties relate, the Company recognizes revenue at the later of (i) when the related sales occur, or (ii) when the performance obligation linked to some or all of the royalty has been satisfied or partially satisfied. To date, the Company has not recognized any royalty revenue resulting from any of its licensing arrangements.

Significant Financing Component – In determining the transaction price, the Company adjusts consideration for the effects of the time value of money if the timing of payments provides the Company with a significant benefit of financing. The Company does not assess whether a contract has a significant financing component if the expectation at contract inception is such that the period between payment by the licensees and the transfer of the promised goods or services to the licensees will be one year or less. The Company assessed each of its revenue arrangements in order to determine whether a significant financing component exists and concluded that a significant financing component does not exist in any of its arrangements.

Collaborative Arrangements – The Company has entered into collaboration agreements, which are within the scope of ASC 606, to discover, develop, manufacture and commercialize product candidates. The terms of these agreements typically contain multiple promises or obligations, which may include: (1) licenses, or options to obtain licenses, to use the Company's technology, (2) research and development activities to be performed on behalf of the collaboration partner, and (3) in certain cases, services in connection with the manufacturing of preclinical and clinical material. Payments the Company receives under these arrangements typically include one or more of the following: non-refundable, upfront license fees; option exercise fees; funding of research and/or development efforts; clinical and development, regulatory, and sales milestone payments; and royalties on future product sales.

The Company analyzes its collaboration arrangements to assess whether the collaboration agreements are within the scope of accounting standards codification ("ASC") ASC 808, *Collaborative Arrangements* ("ASC 808") to determine whether such arrangements involve joint operating activities performed by parties that are both active participants in the activities and exposed to significant risks and rewards dependent on the commercial success of such activities. This assessment is performed throughout the life of the arrangement based on changes in the responsibilities of all parties in the arrangement. For collaboration arrangements within the scope of ASC 808 that contain multiple elements, the Company first determines which elements of the collaboration are deemed to be within the scope of ASC 808 and those that are more reflective of a vendor-customer relationship and, therefore, are within the scope of ASC 606. For elements of collaboration arrangements that are accounted for pursuant to ASC 808, an appropriate recognition method is determined and applied consistently, generally by analogy to ASC 606. For those elements of the arrangement that are accounted for pursuant to ASC 606, the Company applies the five-step model described above.

For additional discussion of accounting for collaboration revenues, see Note 13, "Collaboration and License Agreements."

Research and Development

Research and development costs are expensed as incurred. Research and development expenses are comprised of costs incurred in performing research and development activities including salaries, benefits, share-based compensation, allocations for rent and facility costs, depreciation, preclinical manufacturing expenses, costs of services provided by CROs in connection with preclinical trials and CMOs engaged to manufacture clinical trial material, costs of licensing technology, and costs of services provided by research organizations and service providers. Upfront payments and milestone payments made for the licensing of technology are expensed as research and development in the period in which they are incurred if the technology is not expected to have any alternative future uses other than the specific research and development project for which it was intended. Nonrefundable advance payments for goods or services to be received in the future for use in research and development activities are recorded as prepaid expenses. The prepaid amounts are expensed as the related goods are delivered or the services are performed rather than when the payment is made.

The Company is required to estimate accrued research and development expenses resulting from its obligations under contracts with CROs, CMOs, research organizations, service providers, vendors and consultants in connection with research and development activities. The financial terms of these contracts are subject to negotiations and vary from contract to contract and may result in payment flows that do not match the periods over which materials or services are provided to the Company under such contracts. The Company's objective is to reflect the appropriate research and development expenses in its consolidated statements of operations by matching those expenses with the period in which the services and efforts are expended. There may be instances in which payments made to the Company's vendors will exceed the level of services provided and result in a prepayment of the expense. In accruing fees, the Company estimates the time period over which services will be performed and the level of effort to be expended in each period. If the actual timing of the performance of services or the level of effort varies from the Company's estimate, the Company adjusts the accrual or amount of prepaid expense accordingly.

Comprehensive Loss

Comprehensive loss includes net loss as well as other changes in stockholders' equity that result from transactions and economic events other than those with stockholders. For the years ended December 31, 2021 and December 31, 2020, there was no difference between net loss and comprehensive loss in the accompanying consolidated statement of operations.

Net Loss Per Share

Basic net loss per share is computed by dividing net loss attributable to common stockholders by the weighted-average number of shares of common stock outstanding during the period. Diluted net loss per share is computed using the weighted-average number of shares of common stock outstanding during the period and, if dilutive, the weighted-average number of potential shares of common stock.

The Company's diluted net loss per share is the same as basic net loss per share for the years ended December 31, 2021 and December 31, 2020, given all potential shares of common stock are anti-dilutive as a result of the net loss.

Share-Based Compensation

The Company accounts for all share-based compensation, including stock options and the employee stock purchase plan at fair value and recognizes compensation expense for those equity awards, net of actual forfeitures, over the requisite service period, which is generally the vesting period of the respective award.

The fair value of each equity grant is estimated on the date of grant using the Black-Scholes option-pricing model, which uses as inputs the fair value of the Company's common stock and assumptions the Company makes for the expected volatility of its common stock, the expected term of the stock options, the risk-free interest rate for a period that approximates the expected term of the stock options and the Company's expected dividend yield. As the Company has limited trading history, expected volatility is estimated based on the historical volatility of publicly traded peer companies and the Company expects to continue to do so until such time as it has adequate historical data regarding the volatility of its traded share price. The expected term of the options has been determined utilizing a weighted value considering actual exercise history and estimated expected term based on the midpoint of final vest date and expiration date. The risk-free interest rate is determined by reference to the U.S. Treasury yield curve in effect at the time of grant of the award for time periods approximately equal to the expected term of the award. Expected dividend yield is based on the fact that the Company has never paid cash dividends and does not expect to pay any cash dividends in the foreseeable future.

Income Taxes

Deferred tax assets and liabilities are determined based on the temporary differences between the consolidated financial statement carrying amounts and the tax basis of assets and liabilities using the enacted tax rates in effect in the years in which the differences are expected to reverse. In estimating future tax consequences, all expected future events are considered other than the enactment of changes in the tax law or rates. Changes in deferred tax assets and liabilities are recorded in the provision for income taxes.

The Company may recognize the tax benefit from an uncertain tax position only if it is more likely than not that the tax position will be sustained on examination by the taxing authorities based on the technical merits of the position. The tax benefits recognized in the consolidated financial statements from such a position is measured based on the largest benefit that has a greater than 50% likelihood of being realized upon ultimate settlement.

The Company assesses the likelihood that its deferred tax assets will be recovered from future taxable income and, to the extent it believes, based upon the weight of available evidence, that it is more likely than not that all or a portion of the deferred tax assets will not be realized, a valuation allowance is established through a charge to income tax expense. Potential for recovery of deferred tax assets is evaluated by estimating the future taxable profits expected and considering prudent and feasible tax planning strategies.

Accounting Standards Updates

The Company is an "emerging growth company," as defined in the Jumpstart Our Business Startups Act of 2012, or the JOBS Act, and may take advantage of reduced reporting requirements that are otherwise applicable to public companies. Section 107 of the JOBS Act exempts emerging growth companies from being required to comply with new or revised financial accounting standards until private companies are required to comply with those standards. The Company has elected to use the extended transition period for complying with new or revised accounting standards. The JOBS Act also exempts the Company from having to provide an auditor attestation of internal controls over financial reporting under Sarbanes-Oxley Act Section 404(b).

The Company will remain an “emerging growth company” until the earliest of (i) December 31, 2024, (ii) the last day of the fiscal year in which it has total annual gross revenues of $1.07 billion or more, (iii) the date on which it has issued more than $1.0 billion in nonconvertible debt during the previous three years or (iv) the date on which it is deemed to be a large accelerated filer under the rules of the Securities and Exchange Commission (“SEC”), which generally is when it has more than $700 million in market value of its stock held by non-affiliates as of the prior June 30th.

Other accounting standards updates issued, but not effective until after December 31, 2021, are not expected to have a material effect on the Company’s consolidated financial position, statements of operations or cash flows.

NOTE 2: PROPERTY, EQUIPMENT AND SOFTWARE

Property, equipment and software consisted of the following as of December 31 (in thousands):

	2021	2020
Construction in progress	$ 3,042	$ 1,894
Leasehold improvements	22,784	26,580
Software	312	394
Laboratory equipment	19,291	21,240
Office equipment	1,371	1,542
Furniture and fixtures	2,268	2,518
Total property, equipment and software	49,068	54,168
Less accumulated depreciation and amortization	23,914	19,078
Property, equipment and software - net	$ 25,154	$ 35,090

Depreciation expense, including amortization of leasehold improvements and software, was $8.9 million and $8.7 million for the years ended December 31, 2021 and December 31, 2020, respectively.

NOTE 3: INTANGIBLE ASSETS

Intangible assets, net, consisted of the following as of December 31 (in thousands):

	2021	2020
License cost	$ 2,581	$ 1,831
Less: accumulated amortization	(415)	(340)
Less: impairments	(118)	(118)
Intangible assets, net	2,048	1,373

Amortization expense of intangible assets was less than $0.1 million for the years ended December 31, 2021 and December 31, 2020. Amortization expense for intangible assets with definite lives will be $0.1 million for each of the next five years with the remaining $1.5 million amortized to expense in 2027 and beyond.

NOTE 4: STOCKHOLDERS’ EQUITY

Capital Structure

On April 1, 2019, the Company filed an amendment to its amended and restated certificate of incorporation pursuant to which, among other things, the Company increased its authorized shares to 210,000,000 shares of capital stock, of which 200,000,000 shares were designated as $0.000005 par value common stock and 10,000,000 shares were designated as $0.0001 par value preferred stock.

NOTE 5: SHARE-BASED COMPENSATION

The Company previously granted stock options under its 2006 Stock Incentive Plan (the “2006 Plan”) and its 2015 Stock Incentive Plan (the “2015 Plan”). As of December 31, 2021 there were 3,078,604 stock options outstanding under the 2006 Plan and 2015 Plan and no remaining stock options available to be granted under such plans.

On March 12, 2019, the Company's board of directors adopted, and, on March 14, 2019 the Company's stockholders approved, the Precision BioSciences, Inc. 2019 Incentive Award Plan ("2019 Plan") and the 2019 Employee Stock Purchase Plan ("2019 ESPP"), both of which became effective on March 27, 2019.

The 2019 Plan provides for the grant of incentive stock options, non-qualified stock options, stock appreciation rights, restricted stock, restricted stock units and other share-based awards. The number of shares available for issuance under the 2019 Plan initially equaled 4,750,000 shares of common stock. The 2019 Plan provides for an annual increase to the number of shares of common stock available for issuance on the first day of each calendar year beginning January 1, 2020 and ending on and including January 1, 2029 by an amount equal to the lesser of (i) 4% of the aggregate number of shares of common stock outstanding on the final day of the immediately preceding calendar year and (ii) such smaller number of shares of common stock as determined by the board of directors. As of December 31, 2021, the aggregate number of shares available for issuance under the 2019 Plan has been increased by 4,153,915 pursuant to this provision. Any shares that are subject to awards outstanding under the Company's 2006 Plan and 2015 Plan as of the effective date of the 2019 Plan that expire, lapse, or are terminated, exchanged for cash, surrendered, repurchased, or canceled without having been fully exercised or forfeited, to the extent so unused, will become available for award grants under the 2019 Plan. As of December 31, 2021, 2,692,171 shares were available to be issued under the 2019 Plan. The 2019 Plan had 5,991,710 stock options and 749,295 RSUs outstanding as of December 31, 2021.

Up to 525,000 shares of the Company's common stock were initially reserved for issuance under the 2019 ESPP. The 2019 ESPP provides for an annual increase to the number of shares available for issuance on the first day of each calendar year beginning January 1, 2020 and ending on and including January 1, 2029 by an amount equal to the lesser of (i) 1% of the shares outstanding on the final day of the immediately preceding calendar year and (ii) such smaller number of shares as is determined by our board of directors. As of December 31, 2021, the aggregate number of shares available for issuance under the 2019 ESPP has been increased by 1,038,478 shares pursuant to this provision. No more than 5,250,000 shares of our common stock may be issued under our 2019 ESPP. The purchase price of the shares under the 2019 ESPP, in the absence of a contrary designation, will be 85% of the lower of the fair market value of our common stock on the first trading day of the offering period or on the purchase date. As of December 31, 2021, we had issued 253,115 shares under the 2019 ESPP. As of December 31, 2021, 1,310,363 shares were available to be issued under the 2019 ESPP. The Company recognized share-based compensation expense related to the ESPP of $0.3 million and $0.4 million during the years ended December 31, 2021 and December 31, 2020, respectively.

On August 9, 2021, the Company's board of directors approved the adoption of the Precision BioSciences, Inc. 2021 Employment Inducement Incentive Award Plan ("Inducement Award Plan").

The Inducement Award Plan provides for the grant of non-qualified stock options, stock appreciation rights, restricted stock, restricted stock units and other share-based awards to newly hired employees who have not previously been an employee or member of the board, or an employee who is being rehired following a bona fide period of non-employment by the Company. The number of shares available for issuance under the Inducement Award Plan is 3,000,000 shares of Common Stock. As of December 31, 2021, 2,125,792 shares were available to be issued under the Inducement Award Plan. The Inducement Award plan had 850,000 stock options and 24,208 restricted stock units outstanding as of December 31, 2021.

The Company recorded employee and nonemployee share-based compensation expense as follows (in thousands):

	Years Ended December 31,	
	2021	2020
Employee	$ 14,963	$ 12,639
Nonemployee	1,551	1,147
	$ 16,514	$ 13,786

Share-based compensation expense is included in the following line items in the consolidated statements of operations (in thousands):

	Years Ended December 31,	
	2021	2020
Research and development	$ 9,101	$ 8,338
General and administrative	7,413	5,448
	$ 16,514	$ 13,786

Determining the appropriate fair value model to measure the fair value of the stock option grants on the date of grant and the related assumptions requires judgment. The fair value of each stock option grant is estimated using a Black-Scholes option-pricing model on the date of grant as follows:

	Years Ended December 31,	
	2021	2020
Estimated dividend yield	0.00%	0.00%
Weighted-average expected stock price volatility	73.02%	73.70%
Weighted-average risk-free interest rate	1.07%	0.60%
Expected term of options (in years)	6.25	6.55
Weighted-average fair value per option	$ 6.91	$ 4.81

The expected volatility rates are estimated based on the actual volatility of comparable public companies over the expected term. The expected term represents the average time that stock options that vest are expected to be outstanding. The Company does not have sufficient history of exercising stock options to estimate the expected term of employee stock options and thus utilizes a weighted value considering actual history and estimated expected term based on the midpoint of final vest date and expiration date. The risk-free rate is based on the U.S. Treasury yield curve during the expected life of the option.

The following table summarizes activity in the Company's stock option plans for the years ended December 31, 2021 and December 31, 2020:

	Outstanding Option Shares	Weighted-Average Exercise Price
Balance as of January 1, 2020	8,919,116	7.02
Granted	4,011,728	7.26
Exercised	(1,411,188)	0.49
Forfeited/canceled	(975,386)	8.17
Balance as of December 31, 2020	10,544,270	7.88
Granted	2,831,025	10.62
Exercised	(1,997,700)	3.40
Forfeited/canceled	(1,457,281)	9.84
Balance as of December 31, 2021	9,920,314	9.28

The intrinsic value of stock options exercised was $15.5 million and $10.3 million during the years ended December 31, 2021 and December 31, 2020, respectively.

During the year ended December 31, 2021, the Company granted 849,780 RSUs with a grant date fair value of $9.6 million. The fair value of each award was determined based on the market price of the Company's common stock on the date of grant. The fair value of the RSUs will be recognized as expense over the requisite vesting period.

The following table summarizes the Company's RSU activity for the year ended December 31, 2021:

	RSU Awards	Weighted-Average Grant Date Fair Value
Unvested RSUs as of January 1, 2021	—	—
Granted	849,780	$ 11.30
Forfeited	(76,277)	11.34
Vested	—	—
Unvested RSUs as of December 31, 2021	773,503	$ 11.29

There was approximately $35.3 million of total unrecognized compensation cost related to unvested stock options and RSUs as of December 31, 2021, which is expected to be recognized over a weighted-average period of 2.6 years.

The following table summarizes certain information about stock options granted under the stock option plans which are vested or expected to vest as of December 31, 2021 and December 31, 2020.

Years Ended December 31,		Number of Options	Weighted-Average Remaining Contractual Life (in years)	Weighted-Average Exercise Price
2021	Expected to be exercisable	9,920,314	7.47	$ 9.28
2021	Currently exercisable	4,840,006	6.09	$ 8.83
2020	Expected to be exercisable	10,544,270	7.23	$ 7.88
2020	Currently exercisable	4,582,708	5.48	$ 6.69

The following table summarizes certain information about stock options outstanding under the stock option plans for the years ended December 31, 2021 and December 31, 2020, respectively:

Year Ended December 31, 2021			
Exercise price	Number of Options Outstanding	Weighted- Average Remaining Life	Number of Options Exercisable
$0.02 - $1.20	878,460	4.28	878,460
$5.67 - $6.31	1,330,901	8.18	477,574
$6.45 - $9.79	3,025,794	8.56	1,010,298
$10.17 - $12.52	2,828,331	7.36	1,237,568
$12.60 - $16.00	1,856,828	6.88	1,236,106
	9,920,314		4,840,006

Year Ended December 31, 2020			
Exercise price	Number of Options Outstanding	Weighted- Average Remaining Life	Number of Options Exercisable
$0.01 - $0.04	717,949	0.61	717,949
$0.41 - $1.20	1,472,717	5.11	1,364,991
$5.67 - $9.46	4,414,103	8.75	494,811
$10.17 - $13.80	3,874,957	7.58	1,954,663
$14.91 - $16.00	64,544	4.51	50,294
	10,544,270		4,582,708

NOTE 6: RETIREMENT PLAN

In January 2011, the Company established a defined contribution 401(k) retirement savings plan (the “Retirement Plan”) to all full-time employees. Employee contributions to the Retirement Plan can be 100% of annual compensation up to the prescribed annual maximum under the Internal Revenue Code. Administrative fees of less than $0.1 million were paid by the Company for the years ended December 31, 2021 and December 31, 2020.

The Retirement Plan includes a safe-harbor matching employer contribution equal to 100% of participants’ deferral contributions up to 4%. The Company made contributions of $1.0 million and $0.8 million to the Retirement Plan during the years ended December 31, 2021 and December 31, 2020, respectively. Retirement plan contributions made by the Company are recorded to research and development expense and general and administrative expense as incurred and are included in the consolidated statement of operations.

NOTE 7: COMMITMENTS AND CONTINGENCIES

Litigation

The Company is subject to various legal matters and claims in the ordinary course of business. Although the results of legal proceedings and claims cannot be predicted with certainty, in the opinion of management, there are currently no such known matters that will have a material effect on the consolidated financial condition, results of operations or cash flows of the Company.

COVID-19 Pandemic

In March 2020, the World Health Organization designated the outbreak of the novel strain of coronavirus known as COVID-19 as a global pandemic. The Company has taken steps in line with guidance from the CDC and the State of North Carolina to protect the health and safety of its employees and the community.

The Company is working closely with its clinical sites, physician partners and the patient community to monitor and manage the ongoing impact of the COVID-19 pandemic and variants thereof. The Company remains committed to its clinical programs and development plans, however, disruptions, competing resource demands and safety concerns caused by the COVID-19 pandemic and variants thereof have caused delays in the Company's clinical trial site activation and impacted its ability to enroll patients. The Company may also experience other difficulties, disruptions or delays in conducting preclinical studies, initiating, enrolling, conducting or completing its planned and ongoing clinical trials or supply chain disruptions, and the Company may incur other unforeseen costs as a result. While the extent to which the COVID-19 pandemic and variants thereof may continue to impact the Company's future results will depend on future developments, the pandemic and associated economic impacts could result in a material impact to the Company's future financial condition, results of operations and cash flows.

Servier Program Purchase Agreement

On April 9, 2021, the Company entered into a program purchase agreement with Les Laboratoires Servier and Institut de Recherches Internationales Servier (collectively, "Servier"), pursuant to which the Company reacquired all of its global development and commercialization rights previously granted to Servier pursuant to the Development and Commercial License Agreement by and between Servier and the Company, dated February 24, 2016, as amended (the "Servier Agreement"), and mutually terminated the Servier Agreement (the "Program Purchase Agreement").

The Program Purchase Agreement requires the Company to make certain payments to Servier based on the achievement of regulatory and commercial milestones for each product, and a low- to mid-single-digit percentage royalty (subject to certain reductions) based on net sales of approved products, if any, resulting from any continued development and commercialization of the programs by the Company, for a period not to exceed ten years after first commercial sale of the applicable product in the United States or certain countries in Europe. If the Company enters into specified product partnering transactions, the Program Purchase Agreement requires the Company to pay to Servier a portion of certain consideration received pursuant to such product partnering transactions in lieu of the foregoing milestones (with the exception of a one-time clinical phase development milestone) and royalties.

Regulatory and Commercial Milestones

Management assessed the likelihood of each of the regulatory and commercial milestones included in the Program Purchase Agreement in accordance with ASC 450, *Contingencies* ("ASC 450"). If the assessment of a contingency indicates that it is probable that the milestone will be achieved and the amount of the liability can be estimated, then the estimated liability would be accrued in the Company's consolidated balance sheets. Accordingly, a $10.0 million financial contract liability charged to research and development expense is included in the consolidated financial statements as of and for the year ended December 31, 2021.

Product Partnering Transaction Consideration Due to Servier

Per the terms of the Program Purchase Agreement, should the Company enter into a product partnering transaction with respect to any of the targets previously nominated by Servier, the Company will pay Servier a percentage of the proceeds received. In accordance with ASC 450, management concluded that the amount of proceeds due to Servier as a result of a future product partnering transaction, if any, cannot be reasonably estimated as of the date of this Annual Report on Form 10-K. As such, no contingency for this provision was included in the consolidated financial statements as of December 31, 2021.

Leases

The Company has operating leases for real estate in North Carolina and does not have any finance leases.

Many of the Company's leases contain options to renew and extend lease terms and options to terminate leases early. Reflected in the right-of-use assets and lease liabilities on the Company's consolidated balance sheets are the periods provided by renewal and extension options that the Company is reasonably certain to exercise, as well as the periods provided by termination options that the Company is reasonably certain to not exercise.

The Company has existing leases that include variable lease payments that are not included in the right-of-use assets and lease liabilities and are reflected as an expense in the period incurred. Such payments primarily include common area maintenance charges and fluctuations in rent payments that are driven by factors such as future changes in an index (e.g. the Consumer Price Index).

The Company has existing leases in which the non-lease components (e.g., common area maintenance, consumables, etc.) are paid separately from rent based on actual costs incurred and therefore are not included in the right-of-use assets and lease liabilities but rather reflected as an expense in the period incurred.

The elements of lease expense were as follows:

	For the Years Ended December 31,	
(in thousands)	**2021**	**2020**
Lease Cost		
Operating lease cost	$ 1,951	$ 1,922
Short-term lease cost	342	405
Variable lease cost	1,131	926
Total Lease Cost	$ 3,424	$ 3,253
Other Information		
Operating cash flows used for operating leases	$ 2,649	$ 2,755
Operating lease liabilities arising from obtaining right-of-use assets	-	623
Operating Leases		
Weighted average remaining lease term (in years)	3.7	4.7
Operating Leases		
Weighted average discount rate	7.8%	7.9%

Future lease payments under non-cancelable operating leases with terms of greater than one year as of December 31, 2021, were as follows:

(in thousands)	**December 31, 2021**
2022	$ 2,259
2023	2,323
2024	1,594
2025	529
2026	545
2027 and beyond	372
Total lease payments	$ 7,622
Less: imputed interest	987
Total operating lease liabilities	$ 6,635

Supply Agreements

The Company enters into contracts in the normal course of business with CMOs for the manufacture of clinical trial materials and CROs for clinical trial services. These agreements provide for termination at the request of either party with less than one-year notice and are, therefore, cancelable contracts and, if canceled, are not anticipated to have a material effect on the consolidated financial condition, results of operations, or cash flows of the Company.

NOTE 8: NET LOSS PER SHARE

The Company's potential dilutive securities have been excluded from the computation of diluted net loss per share as the effect of inclusion would be to reduce the net loss per share. Therefore, the weighted-average number of shares of common stock outstanding used to calculate both basic and diluted net loss per share attributable to common stockholders is the same.

	Years Ended December 31,	
	2021	2020
Net loss attributable to common stockholders (in thousands)	$ (30,602)	$ (109,006)
Weighted average shares outstanding - basic and diluted	58,688,102	52,031,740
Net loss per share - basic and diluted	(0.52)	(2.09)

The following weighted-average common stock equivalents were excluded from the calculation of diluted loss per share because their inclusion would have been anti-dilutive:

	Years Ended December 31,	
	2021	2020
Unvested Restricted Stock Units	430,026	—
Stock Options	4,626,930	3,543,844
Unsettled ESPP Contributions	12,550	21,466
Total common stock equivalents excluded from diluted net loss per share	5,069,506	3,565,310

NOTE 9: DEBT

Elo Loan

On May 19, 2021, Elo entered into the Elo Loan in the amount of $2.5 million. In connection with the Elo Loan, the Company issued warrants to PWB (the "Warrants"). For further discussion of accounting for the Warrants, see Note 12, "Fair Value Measurements."

The Elo Loan discount less than $0.1 million upon issuance and includes debt issuance costs incurred by the Company as well as the fair value of the Warrants on the issuance date. On December 14, 2021, the Company repaid all outstanding principal and interest on the Elo Loan with proceeds from the Revolving Line.

Revolving Line

Pursuant to the terms of the loan and security agreement with Pacific Western Bank (the "Revolving Line") the Company may request advances on a revolving line of credit of up to an aggregate principal of $30.0 million.

The Revolving Line matures on June 23, 2023. All outstanding principal amounts are due on the maturity date. The Company must also maintain an aggregate balance of unrestricted cash at Pacific Western bank ("PWB") (not including amounts in certain specified accounts) equal to or greater than $10.0 million. The interest rate under the Revolving Line is a variable annual rate equal to the greater of (a) 2.75% above the Prime Rate (as defined in the Revolving Line), or (b) 6.00%. As of December 31, 2021, the stated interest rate on the Revolving line was 6.0% and the effective interest rate was 6.8%.

On December 14, 2021, the Company borrowed $2.5 million under the Revolving Line to pay all outstanding principal on the Elo Loan. The borrowing was concluded to be a modification of the Elo Loan under ASC 470, *Debt*. As such, the remaining unamortized discount on the Elo Loan will be amortized to interest expense over the life of the Revolving Line. As of December 31, 2021, no other borrowings have been made under the Revolving Line.

NOTE 10: INCOME TAXES

The Company recorded no federal income tax expense and due to the operating losses incurred for the years ended December 31, 2021 and December 31, 2020. The Company recorded no state income tax expense and less than $0.1 million state income expense for the years ended December 31, 2021 and December 31, 2020, respectively.

Significant components of the Company's deferred tax assets and deferred tax liabilities are as follows (in thousands):

	Years Ended December 31,	
	2021	2020
Noncurrent deferred tax assets:		
Net operating loss carryforwards	$ 41,162	$ 39,264
Contribution carryforwards	48	39
Deferred rent	—	—
Lease liability	1,526	2,336
Deferred revenue	20,294	18,684
Other assets	11,647	5,015
Tax credits	20,942	15,959
Less: valuation allowance	(94,071)	(79,273)
Total deferred tax assets, noncurrent	1,548	2,024
Noncurrent deferred tax liability:		
Property and equipment	—	601
Investments and other	587	—
Right of use asset	961	1,423
Total deferred tax liabilities, noncurrent	1,548	2,024
Net deferred tax assets	$ —	$ —

As of December 31, 2021 and December 31, 2020, the Company has provided a valuation allowance for the full amount of the net deferred tax assets as the realization of the net deferred tax assets is not determined to be more likely than not. The net increase in the valuation allowance for the year ended December 31, 2021 of $14.8 million is comprised of an increase in the valuation allowance recorded against the deferred tax assets, primarily related to tax credits and NOL carryforwards for the year.

The reasons for the difference between actual income tax benefit for the years ended December 31, 2021 and December 31, 2020 and the amount computed by applying the statutory federal income tax rate to losses before income tax benefit are as follows (in thousands):

	Year Ended December 31, 2021		Year Ended December 31, 2020	
	Amount	% of Pre-Tax Earnings	Amount	% of Pre-Tax Earnings
Income tax expense at statutory rate	$ (6,677)	21.8%	$ (22,887)	21.0%
State income taxes, net of federal tax benefit	(634)	2.1%	(1,309)	1.2%
Non-deductible expenses	121	(0.4%)	(963)	0.9%
Stock compensation - nondeductible	(2,094)	6.8%	—	0.0%
R&D and orphan drug credits	(5,239)	17.1%	(6,869)	6.3%
Other	567	(1.9%)	7	0.1%
Change in state tax rate	(843)	2.8%	512	(0.6%)
Change in valuation allowance	14,799	(48.3%)	31,532	(28.9%)
Income tax (benefit) expense	$ —	0.0%	$ 23	0.0%

As of December 31, 2021, the Company had federal, state, and foreign NOL carryforwards of approximately $181.0 million, $122.2 million, and $0.4 million respectively. As of December 31, 2020, the Company had federal, state, and foreign NOL carryforwards of approximately $172.7 million, $116.5 million, and $0.6 million, respectively.

Federal NOL carryforwards of $19.7 million begin to expire in 2030 while the remaining federal NOL carryforward of $161.2 million carries forward indefinitely. The state NOL carryforwards begin to expire in 2025. The foreign NOLs carryforward indefinitely. At December 31, 2021, the Company had federal and state R&D tax credits of $11.4 million and an amount less than $0.1 million, which

begin to expire in 2027 and 2030, respectively. At December 31, 2020, the Company had federal and state tax R&D credits of $9.9 million and an amount less than $0.1 million which begin to expire in 2027 and 2030, respectively. As of December 31, 2021 and December 31, 2020, the Company had federal Orphan Drug credits of $9.5 million and $6.0 million, respectively, which begin to expire in 2038. At December 31, 2021 and December 31, 2020, the Company had federal contribution carryforwards of $0.2 million which begin to expire in 2022.

The Company incorporated a subsidiary in Australia in 2018. However, in 2021, as part of the ELO transaction, the subsidiary was transferred to New Elo. There are no undistributed earnings as of December 31, 2021 and December 31, 2020.

The Company incorporated a subsidiary in the UK in 2019. However, the subsidiary has had minimal activity since inception. As such, there are no undistributed earnings as of December 31, 2021 and December 31, 2020.

The Company's ability to utilize its NOL and R&D credit carryforwards may be substantially limited due to ownership changes that may have occurred or that could occur in the future, as required by Section 382 of the Internal Revenue Code of 1986, as amended (the Code), as well as similar state provisions. These ownership changes may limit the amount of NOL and R&D credit carryforwards that can be utilized annually to offset future taxable income and tax, respectively. In general, an "ownership change," as defined by Section 382 of the Code, results from a transaction or series of transactions over a three-year period resulting in an ownership change of more than 50 percent of the outstanding stock of a company by certain stockholders or public groups. The Company has not completed a study to assess whether one or more ownership changes have occurred since the Company became a loss corporation under the definition of Section 382. If the Company has experienced an ownership change, utilization of the NOL or R&D credit carryforwards would be subject to an annual limitation, which is determined by first multiplying the value of the Company's stock at the time of the ownership change by the applicable long-term, tax-exempt rate, and then could be subject to additional adjustments, as required. Any such limitation may result in the expiration of a portion of the NOL or R&D credit carryforwards before utilization. Until a study is completed and any limitation known, no amounts are being considered as an uncertain tax position or disclosed as an unrecognized tax benefit. Any carryforwards that expire prior to utilization as a result of such limitations will be removed from deferred tax assets with a corresponding reduction of the valuation allowance. Due to the existence of the valuation allowance, it is not expected that any possible limitation will have an impact on the results of operations of the Company.

The Company reflects in the accompanying consolidated financial statements the benefit of positions taken in a previously filed tax return or expected to be taken in a future tax return only if it is considered 'more-likely-than-not' that the position taken will be sustained by the appropriate taxing authority. As of December 31, 2021 and December 31, 2020, the Company had no unrecognized income tax benefits. The Company's policy for recording interest and penalties relating to uncertain income tax positions is to record them as a component of income tax expense in the accompanying consolidated statements of operations. As of December 31, 2021 and December 31, 2020, the Company had no such accruals.

In November 2021, North Carolina enacted the 2021 Appropriations Act, which included a gradual corporate income tax rate decrease from the current 2.5% to 0% by 2030. Due to the uncertainty of projecting income through 2030, the Company calculated, before consideration of the valuation allowance, its North Carolina net operating losses using the current 2.5% rate which is in effect through 2024. The Company will continue to monitor its future North Carolina taxable income and its ability to utilize its deferred tax asset for its net operating loss carryover. If the Company does not become profitable in North Carolina prior to 2025, or it becomes more certain that the Company will not be able to utilize its North Carolina net operating losses before the tax rate drops to 0%, the Company will then remeasure its deferred tax asset at that time.

The TCJA of 2017 subjects a U.S. shareholder to tax on global intangible low-taxed income ("GILTI") earned by certain foreign subsidiaries. The FASB Staff Q&A, Topic 740, No. 5, *Accounting for Global Intangible Low-Taxed Income*, states that an entity can make an accounting policy election to either recognized deferred taxes for temporary basis differences expected to reverse as GILTI in future years or to provide for the tax expense related to GILTI in the year the tax is incurred as a period expense only. The Company has elected to account for GILTI in the year the tax is incurred. The Company does not have a GILTI inclusion in years ends December 31, 2021 or December 31, 2020 and therefore, no GILTI tax has been recorded for the years then ended.

NOTE 11: Elo Transaction

On December 17, 2021, the Company and its wholly owned subsidiary, Elo Life Systems, Inc., entered into an agreement pursuant to which the Company contributed substantially all of the assets of the Company's food segment to New Elo. In connection with the contribution, the Company also granted New Elo an exclusive license to certain of the Company's intellectual property for use in non-medical applications with respect to plants, farm animals and certain other organisms. In addition, all of the Company's employees in its Food segment, including its management, became employees of New Elo.

Promissory Note

As partial consideration for the assets contributed and license granted by the Company to New Elo, the Company received a $10.0 million promissory note payable from New Elo (the "Note"). The Note matures on the earlier of (i) December 1, 2028 or (ii) a Deemed Liquidation Event (as defined in the New Elo's Amended and Restated Certificate of Incorporation). The Note accrues interest at 2.00% per annum, and is payable annually on December 17th.

At acquisition, the Company classified the Note as held-to-maturity as it was concluded the Company has the intent and ability to hold the Note to its maturity date. As the Elo Transaction was concluded to be a nonmonetary transaction per ASC 845, *Nonmonetary Transactions*, the Note was initially recorded at fair value, as the fair value of the Note was deemed more clearly evident than the fair value of the assets surrendered. The fair value was determined by discounting the future cash flows using the market interest rate of similar debt as of the date of the Elo Transaction.

The fair value of the Note at acquisition was $6.9 million. The note discount of $3.1 million will be amortized to interest income over the life of the Note.

Investment in New Elo

As partial consideration for the assets contributed and license granted by the Company to New Elo, the Company received Common Stock in New Elo. It was determined that the noncontrolling shareholders of New Elo have substantive rights to participate in the financial and operating decisions of New Elo. As such, it was determined that the Company does not possess control over New Elo or have significant decision-making authority. Accordingly, New Elo will not be consolidated in the Company's financial statements.

However, as the Company obtained approximately 55% of the voting shares in New Elo, it was determined that the Company possesses the ability to exercise significant influence over the operating and financial policies of New Elo. As such, the Company accounts for its investment in New Elo under the equity method. Per ASC 323, Investments—Equity Method and Joint Ventures, upon the transfer of a subsidiary or group of assets that is a business accounted for under the equity method, the initial carrying value should be recorded based upon the fair value as of the transaction date. As such, the initial carrying value of the Company's investment in New Elo was determined to be the fair value of the Company's common stock in New Elo as of December 17, 2021, the transaction date.

The Company's proportionate share of New Elo's net income for the period of December 18, 2021 to December 31, 2021 was $0.2 million, resulting in an increase in the carrying value of the Investment in New Elo and corresponding income from equity method investments.

Gain on Deconsolidation of Subsidiary

The gain on deconsolidation of subsidiary was determined based on the difference between the $4.4 million book value of the net assets that the Company contributed to New Elo and the $10.4 million combined fair value of the Note and the Company's ownership in New Elo as of December 17, 2021.

NOTE 12: FAIR VALUE MEASUREMENTS

The carrying amounts of the Company's financial instruments, including accounts receivable, accounts payable, and accrued expenses and other current liabilities, approximate their respective fair values due to their short-term nature. The Company uses a three-tier fair value hierarchy to classify and disclose all assets and liabilities measured at fair value on a recurring basis and to minimize the use of unobservable inputs when determining their fair value. The three tiers are defined as follows:

Level 1—Observable inputs based on unadjusted quoted prices in active markets for identical assets or liabilities

Level 2—Inputs, other than quoted prices in active markets, that are observable either directly or indirectly

Level 3—Unobservable inputs for which there is little or no market data, which require the Company to develop its own assumptions

Cash Equivalents

As of December 31, 2021 and December 31, 2020, the Company held an insignificant amount of cash equivalents which were composed of investments in money market funds. The Company classifies investments in money market funds within Level 1 of the fair value hierarchy as the prices are available from quoted prices in active markets.

Investment in iECURE

In August 2021, the Company entered into an Equity Issuance Agreement with iECURE, pursuant to which iECURE granted the Company partial equity ownership in iECURE (the "iECURE equity") as partial consideration for a license to the Company's PCSK9-directed ARCUS nuclease to develop gene-insertion therapies for four other rare genetic diseases, including OTC deficiency, Citrullinemia Type 1, PKU, and another program focused on liver disease (the "PCSK9 license"). On issuance, the Company accounted for the iECURE equity at fair value under ASC 825. Accordingly, the Company adjusts the carrying value of the iECURE equity to fair value each reporting period with any changes in fair value recorded to other income (expense).

The Company classifies the iECURE equity within Level 3 of the fair value hierarchy as the assessed fair value was based on significant unobservable inputs given iECURE equity is not traded on a public exchange. For additional discussion of accounting for the Company's Development and License agreement with iECURE and the Equity Issuance Agreement, refer to Note 13, "Collaboration and License Agreements."

Warrant Liability

In connection with the Elo Loan, the Company issued $50,000 of warrants to PWB on May 19, 2021 (the "Warrants"). The Company accounted for the Warrants in accordance with the guidance contained in ASC 815, under which the Warrants do not meet the criteria for equity treatment and are recorded as a liability. Accordingly, the Company classified the Warrants as a non-current liability at their fair value and adjusted the warrant liability to fair value each reporting period with any changes in fair value recognized in the statement of operations. The Company utilized the Black-Scholes option pricing model to value the warrant liability each reporting period and recorded changes in value to other income (expense).

Upon the closing of the Elo Transaction, the Warrants transferred to New Elo. Accordingly, the warrant liability was marked to fair value as of December 17, 2021 and included in the book value of net assets transferred to New Elo upon deconsolidation.

The following represents assets measured at fair value on a recurring basis by the Company (in thousands):

December 31, 2021	Fair Value	Level 1	Level 2	Level 3
Money market funds	$ 12	$ 12	$ —	$ —
Investment in iECURE	3,091	—	—	3,091
	$ 3,103	$ 12	$ —	$ 3,091

December 31, 2020	Fair Value	Level 1	Level 2	Level 3
Assets:				
Money market funds	$ 10	$ 10	$ —	$ —
	$ 10	$ 10	$ —	$ —

The following represents a reconciliation of assets measured and carried at fair value on a recurring basis with the use of significant unobservable inputs (Level 3) for the year ended December 31, 2021 (in thousands):

	Investment in iECURE
Balance December 31, 2020	$ —
Acquisitions	538
Gains included in earnings	2,553
Dispositions	—
Balance December 31, 2021	$ 3,091

The following represents a reconciliation of liabilities measured and carried at fair value on a recurring basis with the use of significant unobservable inputs (Level 3) for the year ended December 31, 2021 (in thousands):

	Warrant Liability
Balance December 31, 2020	$ —
Acquisitions	(30)
Gains included in earnings	2
Dispositions	28
Balance December 31, 2021	$ —

NOTE 13: COLLABORATION AND LICENSE AGREEMENTS

Development and License Agreement with Eli Lilly

On November 19, 2020, the Company, entered into the Development and License Agreement with Lilly to collaborate to discover and develop *in vivo* gene editing products incorporating the Company's ARCUS nucleases. Lilly has initially nominated Duchenne muscular dystrophy, a liver-directed target and a CNS directed target. Under the terms of the Development and License Agreement, Lilly has the right to nominate up to three additional gene targets for genetic disorders over the Nomination Period. Lilly may extend the Nomination Period for an additional two years from the date on which such initial Nomination Period ends, upon Lilly's election and payment of an extension fee. Additionally, under the terms of the Development and License Agreement, Lilly has the option to replace up to two gene targets upon Lilly's election and payment of a replacement target fee. Under the terms of the Development and License Agreement, Lilly will receive an exclusive license to research, develop, manufacture and commercialize the resulting licensed products to diagnose, prevent and treat any and all diseases by *in vivo* gene editing directed against the applicable gene target. The Development and License Agreement provides that the Company will be responsible for conducting certain pre-clinical research and investigational new drug application ("IND") enabling activities with respect to the gene targets nominated by Lilly to be subject to the collaboration, including manufacture of initial clinical trial material for the first licensed product. Lilly will be responsible for, and must use commercially reasonable efforts with respect to, conducting clinical development and commercialization activities for licensed products resulting from the collaboration, and may engage the Company for additional clinical and/or initial commercial manufacture of licensed products.

Upon closing of the Development and License Agreement on January 6, 2021, the Company received an upfront cash payment of $100.0 million. The Company will also be eligible to receive milestone payments of up to an aggregate of $420.0 million per licensed product as well as nomination fees for additional targets and certain research funding. If licensed products resulting from the collaboration are approved and sold, the Company will also be entitled to receive tiered royalties ranging from the mid-single digit percentages to the low-teens percentages on world-wide net sales of the licensed products, subject to customary potential reductions. Lilly's obligation to pay royalties to the Company expires on a country-by-country and licensed product-by-licensed product basis, upon the latest to occur of certain events related to expiration of patents, regulatory exclusivity or a period of ten years following first commercial sale of the licensed product. Simultaneously with the entry into the Development and License Agreement, the Company and Lilly entered into a Share Purchase Agreement (the "Share Purchase Agreement"), pursuant to which Lilly purchased 3,762,190 shares of the Company's common stock for a purchase price of $35.0 million. Management concluded that the Lilly Share Purchase Agreement is to be combined with the Development and License Agreement (together, the "Combined Agreements") for accounting purposes. Of the total $135.0 million upfront compensation, the Company applied equity accounting guidance to measure the $27.7 million recorded in equity upon the issuance of the shares, and $107.3 million was identified as the transaction price allocated to the revenue arrangement.

The Company assessed this arrangement in accordance with ASC 606 and concluded that the promises in the agreement represent transactions with a customer. The Company has determined that the promises associated with the research and development activities for each of the targets are not distinct because they are all based on the ARCUS proprietary genome editing platform. The Company has concluded that the agreement with Lilly contains the following promises: (i) license of intellectual property; (ii) performance of R&D services, (iii) the manufacture of pre-clinical supply, (iv) Joint Steering Committee ("JSC") Participation, and (v) regulatory responsibilities. The Company determined that the license of intellectual property, R&D services, manufacture of pre-clinical development material, and regulatory responsibilities were not distinct from each other, as the license, R&D services, pre-clinical supply, and regulatory responsibilities are highly interdependent upon one another. The JSC participation was determined to be an immaterial promise as the time commitment and related cost associated with performance of JSC participation is expected to be inconsequential to the total consideration in the contract. As such, the Company determined that these promises should be combined into a single performance obligation.

The Company recognizes revenue from the $100.0 million upfront cash payment, $7.3 million allocated to the transaction price from the Stock Purchase Agreement, and variable consideration on an input method in the form of research effort relative to expected research effort at the completion of the performance obligation, which is based on the actual time of R&D activities performed relative to expected time to be incurred in the future to satisfy the performance obligation. Management evaluates and adjusts the total expected research effort for the performance obligation on a quarterly basis based upon actual research progress to date relative to research progress forecasts. The transfer of control occurs over this time period and, in management's judgment, is the best measure of progress towards satisfying the performance obligation.

During the year ended December 31, 2021, the Company recognized revenue under the agreement with Lilly of approximately $21.0 million. The Company recognized no revenue under the agreement with Lilly during the year ended December 31, 2020. Deferred

revenue related to the agreement with Lilly amounted to $88.3 million as of December 31, 2021, of which $21.2 million was included in current liabilities. No deferred revenue related to the Development and License Agreement with Lilly was recorded as of December 31, 2020.

Development and License Agreement with iECURE

In August 2021, the Company entered into a development and license agreement with iECURE under which iECURE plans to advance the Company's PBGENE-PCSK9 candidate through a Phase 1 clinical trial as partial consideration for the PCSK9 License.

Pursuant to the iECURE Agreement, the Company retains the rights to PBGENE-PCSK9, including all products developed for indications with increased risk of severe cardiovascular events such as Familial Hypercholesterolemia. Simultaneously with the entry into the iECURE Agreement, the Company and iECURE entered into an Equity Issuance Agreement, pursuant to which iECURE granted the Company partial equity ownership in iECURE as partial consideration for the license to use its PCSK9-directed ARCUS nuclease. Management concluded that the iECURE Equity Issuance Agreement is to be combined with the development and license agreement with iECURE for accounting purposes. Additionally, the Company is eligible to receive milestone and mid-single digit to low double digit royalty payments on sales of iECURE products developed with ARCUS.

The Company assessed the iECURE Agreements in accordance with ASC 606 and concluded that the promises in the iECURE Agreements represent a transaction with a customer. The Company has concluded that the iECURE Agreements contain the following promises: (i) the PCSK9 license and (ii) JSC Participation. The JSC participation was determined to be an immaterial promise as the time commitment and related cost associated with performance of JSC participation is expected to be inconsequential to the total consideration in the contract. Accordingly, the Company concluded that the promise of the PCSK9 license is the sole performance obligation in the iECURE Agreements.

The fair value of the iECURE equity and the estimated fair value of the costs to be incurred by iECURE to progress the Company's PBGENE-PCSK9 candidate through Phase 1 studies were concluded to be non-cash consideration, and as such were included in the transaction price of the iECURE Agreements. The Company concluded the PCSK9 license represents functional intellectual property in accordance with ASC 606 given the Company will not be providing any additional services to iECURE outside of the right to use the PCSK9 license. Therefore, the fair value of the iECURE equity and the fair value of the costs to be incurred by iECURE to progress the Company's PBGENE-PCSK9 candidate through a Phase 1 clinical trial was recognized at the inception of the iECURE Agreements.

The fair value of the iECURE equity at inception of the iECURE agreements was assessed to be $0.5 million and was initially recorded to the investment in equity securities line item of the consolidated balance sheets. As further discussed in Note 12, "Fair Value Measurements," on issuance, Management elected to account for the iECURE equity at fair value under ASC 825. Accordingly, the Company adjusts the carrying value of the iECURE equity to fair value each reporting period with any changes in fair value recorded to other income (expense). The fair value of the costs to be incurred by iECURE to progress the Company's PBGENE-PCSK9 candidate through a Phase 1 clinical trial (the "PCSK9 Prepaid") was assessed to be $17.4 million and was recorded to the prepaid expenses and other assets line items of the consolidated balance sheets. The PCSK9 Prepaid is amortized to research and development expense on a pro-rata basis as iECURE incurs costs to progress the PBGENE-PCSK9 candidate through a Phase 1 clinical trial.

During the year ended December 31, 2021, the Company recognized revenue under the iECURE agreements of $17.9 million and $4.4 million of research and development expense related to amortization of the PCSK9 Prepaid. As of December 31, 2021, the remaining balance of the PCSK9 Prepaid was $13.0 million, which is included in the prepaid expenses and other assets line items of the consolidated balance sheets in the amounts of $10.4 million and $2.6 million, respectively.

Development and Commercial License Agreement with Servier

The Company has developed certain allogeneic CAR T candidates, including PBCAR0191 and the stealth cell PBCAR19B, each targeting CD19, as well as four additional product targets under the Servier Agreement. Pursuant to the terms of the Program Purchase Agreement, the Company regained full global rights to research, develop, manufacture and commercialize products resulting from such programs, with sole control over all activities. Additionally, per the terms of the Program Purchase Agreement the Company does not have an obligation to continue development of the Servier Targets. With respect to products directed to CD19, Servier has certain rights of negotiation, which may be exercised during a specified time period if the Company elects to initiate a process or entertain third party offers for partnering such products.

Pursuant to the terms of the Program Purchase Agreement, the Company made a payment of $1.25 million in cash to Servier and agreed to waive earned milestones totaling $18.75 million that would have been otherwise payable to the Company. The $1.25 million cash payment to Servier is classified as research and development expense in the consolidated statement of operations for the year

ended December 31, 2021. The waiver of earned milestones resulted in a $18.75 million reduction in accounts receivable and deferred revenue.

The Program Purchase Agreement also requires the Company to make certain payments to Servier based on the achievement of regulatory and commercial milestones for each product, and a low- to mid-single-digit percentage royalty (subject to certain reductions) based on net sales of approved products, if any, resulting from any continued development and commercialization of the programs by the Company, for a period not to exceed ten years after first commercial sale of the applicable product in the United States or certain countries in Europe. If the Company enters into specified product partnering transactions, the Program Purchase Agreement requires the Company to pay to Servier a portion of certain consideration received pursuant to such product partnering transactions in lieu of the foregoing milestones (with the exception of a one-time clinical phase development milestone) and royalties. For additional discussion of accounting for payment obligations arising from the Program Purchase Agreement, refer to Note 7, “Commitments and Contingencies.”

Upon the closing of the Program Purchase Agreement, management concluded that the combined performance obligation associated with the Servier Agreement was fully satisfied as the Company is no longer required to perform research and development work on the Servier targets and the Company regained all of its global development and commercialization rights previously granted to under the Servier Agreement. Accordingly, all remaining deferred revenue related to the Servier agreement was recognized as revenue in the year ended December 31, 2021.

During the year ended December 31, 2021 and 2020, the Company recognized revenue under the agreement with Servier of approximately $72.9 million and $18.0 million, respectively. The Company did not have deferred revenue related to the agreement with Servier as of December 31, 2021. Deferred revenue related to the agreement with Servier amounted to $82.9 million as of December 31, 2020, of which $28.9 million was included in current liabilities.

Collaboration and License Agreement with Gilead

On July 6, 2020, Gilead notified the Company of its termination of the Gilead Agreement. Pursuant to the termination notice, the Gilead Agreement terminated on September 4, 2020, upon which the Company regained full rights and all data it generated for the *in vivo* chronic HBV program developed under the Gilead Agreement.

Revenue associated with the combined performance obligation was recognized on a straight-line basis as the R&D services were provided through the Termination Notice Date. During the years ended December 31, 2021 and 2020, the Company recognized no revenue and approximately $3.9 million of revenue under the Gilead Agreement, respectively. The Company did not have deferred revenue related to the Gilead Agreement as of December 31, 2021 or December 31, 2020. No development or sales-based milestone payments were received under the Gilead Agreement.

NOTE 14: SEGMENT REPORTING

The Company has determined that the Chief Executive Officer (“CEO”) is the Company’s chief operating decision maker (“CODM”) as the CEO makes decisions as it relates to allocation of resources and key market strategies. Prior to the Elo Transaction, the CODM reviewed financial results disaggregated by our therapeutics and food businesses. As such, prior to December 18, 2021, the Company operated in two reportable segments: Therapeutics and Food. The legacy Therapeutics segment included our development of products in the field of immuno-oncology and of novel products outside immuno-oncology to treat human diseases. The legacy Food segment focused on applying ARCUS to develop food and nutrition products through collaboration agreements with consumer-facing companies.

Following the Elo Transaction on December 17, 2021, in which the Company contributed substantially all of the assets of the Food segment to a newly formed entity, the CODM now reviews financial information presented on a consolidated basis and resource allocation and key market strategy decisions are made by the CODM based on consolidated results.

As such, the Company has concluded that following the Elo Transaction on December 17, 2021, the Company now operates as one segment. Given the Company was managed under the legacy segment structure of Therapeutics and Food for the majority of the year ended December 31, 2021, segment results for both Therapeutics and Food have been presented in this Annual Report on Form 10-K.

Segment operating income (loss) is derived by deducting operational cash expenditures, net, from GAAP revenue. Operational cash expenditures are cash disbursements made that are directly attributable to the reportable segment (including directly attributable research and development and property, equipment, and software expenditures). The reportable segment operational cash expenditures

include cash disbursements for compensation, laboratory supplies, purchases of property, equipment and software and procuring services from CROs, CMOs and research organizations.

Certain cost items are not allocated to the Company's reportable segments. These cost items primarily consist of compensation and general operational expenses associated with the Company's executive, business development, finance, operations, human resources and legal functions. The Company does not allocate non-cash income statement amounts to its reportable segments, such as share based compensation, depreciation and amortization, intangible asset impairment charges, non-cash interest expense and losses on the disposal of assets. When reconciling segment operating loss to consolidated loss from operations, the Company makes an adjustment to convert the cash expenditures to the accrual basis to reflect GAAP.

All segment revenue is earned in the United States and there are no intersegment revenues. Additionally, the Company reports assets on a consolidated basis and does not allocate assets to its reportable segments for purposes of assessing segment performance or allocating resources.

Presented below is the financial information with respect to the Company's reportable segments:

	For the Years Ended December 31,	
(in thousands)	**2021**	**2020**
Revenue:		
Therapeutics	$ 111,723	$ 21,863
Food	3,806	2,422
Total segment revenue	115,529	24,285
Segment operational cash expenditures:		
Therapeutics	$ 79,746	$ 71,841
Food	7,635	7,587
Total segment operational cash expenditures	87,381	79,428
Segment operating income (loss):		
Therapeutics	$ 31,977	$ (49,978)
Food	(3,829)	(5,165)
Total segment operating income (loss)	$ 28,148	$ (55,143)
Adjustments to reconcile segment operating loss to consolidated loss from operations		
Corporate general and administrative cash expenditures	$ (33,096)	$ (30,090)
Interest income received included in segment operating loss	(186)	(822)
Depreciation and amortization	(8,981)	(8,777)
Share-based compensation	(16,514)	(13,786)
Loss on disposal of assets	(26)	35
Non-cash interest expense	(59)	-
Amortization of right-of-use assets	(1,216)	(1,036)
Adjustments to reconcile cash expenditures to GAAP expenses	(7,472)	(209)
Total consolidated loss from operations	$ (39,402)	$ (109,828)

DESCRIPTION OF THE REGISTRANT'S SECURITIES REGISTERED PURSUANT TO SECTION 12 OF THE SECURITIES EXCHANGE ACT OF 1934, AS AMENDED

As of December 31, 2021, Precision BioSciences, Inc. had one class of securities registered under Section 12 of the Securities Exchange Act of 1934, as amended (the "Exchange Act"). References herein to "we," "us," "our" and the "Company" refer to Precision BioSciences, Inc. and not to any of its subsidiaries.

The following description of our common stock and certain provisions of our amended and restated certificate of incorporation and amended and restated bylaws are summaries and are qualified in their entirety by reference to the full text of our amended and restated certificate of incorporation and our amended and restated bylaws, each of which have been publicly filed with the Securities and Exchange Commission (the "SEC"). We encourage you to read our amended and restated certificate of incorporation and our amended and restated bylaws and the applicable provisions of the Delaware General Corporation Law (the "DGCL") for additional information.

Authorized Capital Stock

Our authorized capital stock consists of 200,000,000 shares of common stock, par value $0.000005 per share, and 10,000,000 shares of preferred stock, par value $0.0001 per share, all of which are undesignated.

Common Stock

Holders of our common stock are entitled to one vote for each share held on all matters submitted to a vote of stockholders and do not have cumulative voting rights. An election of directors by our stockholders shall be determined by a plurality of the votes cast. All other elections and questions presented to the stockholders shall be decided by the affirmative vote of the holders of a majority in voting power of the votes cast affirmatively or negatively (excluding abstentions) at the meeting by the holders entitled to vote thereon. Holders of common stock are entitled to receive proportionately any dividends as may be declared by our board of directors, subject to any preferential dividend rights of any series of preferred stock that we may designate and issue in the future.

In the event of our liquidation or dissolution, the holders of our common stock are entitled to receive proportionately our net assets available for distribution to stockholders after the payment of all debts and other liabilities and subject to the prior rights of any outstanding preferred stock. Holders of our common stock have no preemptive, subscription, redemption or conversion rights. Our outstanding shares of common stock are, and the shares offered by us in this offering will be, when issued and paid for, validly issued, fully paid and nonassessable. The rights, preferences and privileges of holders of common stock are subject to and may be adversely affected by the rights of the holders of shares of any series of preferred stock that we may designate and issue in the future.

Preferred Stock

Under the terms of our amended and restated certificate of incorporation, our board of directors is authorized to direct us to issue shares of preferred stock in one or more series without stockholder approval. Our board of directors has the discretion to determine the rights, preferences, privileges and restrictions, including voting rights, dividend rights, conversion rights, redemption privileges and liquidation preferences, of each series of preferred stock.

The issuance of preferred stock, while providing flexibility in connection with possible acquisitions, future financings and other corporate purposes, could have the effect of making it more difficult for a third-party to acquire, or could discourage a third-party from seeking to acquire, a majority of our outstanding voting stock.

Anti-takeover Provisions

Some provisions of Delaware law and our amended and restated certificate of incorporation and our amended and restated bylaws could make the following transactions more difficult: an acquisition of us by means of a tender offer; an acquisition of us by means of a proxy contest or otherwise; or the removal of our incumbent officers and directors. It is possible that these provisions could make it more difficult to accomplish or could deter

transactions that stockholders may otherwise consider to be in their best interests or in our best interests, including transactions that provide for payment of a premium over the market price for our shares.

Undesignated Preferred Stock

The ability of our board of directors, without action by our stockholders, to issue up to 10,000,000 shares of undesignated preferred stock with voting or other rights or preferences as designated by our board of directors could impede the success of any attempt to effect a change in control of the Company. These and other provisions may have the effect of deferring hostile takeovers or delaying changes in control or management of the Company.

Stockholder Meetings

Our amended and restated bylaws provide that a special meeting of stockholders may be called only by the chairman of our board of directors, our chief executive officer or president (in the absence of a chief executive officer), or by a resolution adopted by a majority of our board of directors.

Requirements for Advance Notification of Stockholder Nominations and Proposals

Our amended and restated bylaws establish advance notice procedures with respect to stockholder proposals to be brought before a stockholder meeting and the nomination of candidates for election as directors, other than nominations made by or at the direction of our board of directors or a committee of our board of directors.

Elimination of Stockholder Action by Written Consent

Our amended and restated certificate of incorporation eliminates the right of stockholders to act by written consent without a meeting.

Staggered Board

In accordance with our amended and restated certificate of incorporation, our board of directors is divided into three classes. The directors in each class serve for a three-year term, with one class being elected each year by our stockholders. Our amended and restated certificate of incorporation and amended and restated bylaws provide that the authorized number of directors may be changed only by resolution of the board of directors. Any additional directorships resulting from an increase in the number of directors will be distributed among the three classes so that, as nearly as possible, each class will consist of one-third of the directors. This system of electing and removing directors may delay or prevent a change of our management or a change in control of our company and may tend to discourage a third party from making a tender offer or otherwise attempting to obtain control of us, because it generally makes it more difficult for stockholders to replace a majority of the directors.

Removal of Directors

Our amended and restated certificate of incorporation provides that no member of our board of directors may be removed from office by our stockholders except for cause and, in addition to any other vote required by law, upon the approval of the holders of at least two-thirds in voting power of the outstanding shares of stock entitled to vote in the election of directors.

Stockholders not Entitled to Cumulative Voting

Our amended and restated certificate of incorporation does not permit stockholders to cumulate their votes in the election of directors. Accordingly, the holders of a majority of the shares of our common stock entitled to vote in any election of directors will be able to elect all of the directors standing for election, if they choose, other than any directors that holders of our convertible preferred stock may be entitled to elect.

Choice of Forum

Our amended and restated certificate of incorporation provides that, unless we consent in writing to the selection of an alternative forum to the fullest extent permitted by law, the Court of Chancery of the State of

Delaware will be the sole and exclusive forum for (1) any derivative action or proceeding brought on our behalf, (2) any action asserting a claim of breach of a fiduciary duty or other wrongdoing by any of our directors, officers, employees or agents to us or our stockholders, (3) any action asserting a claim against us arising pursuant to any provision of the General Corporation Law of the State of Delaware or our certificate of incorporation or bylaws, or (4) any action asserting a claim governed by the internal affairs doctrine. Under our amended and restated certificate of incorporation, this exclusive forum provision does not apply to claims which are vested in the exclusive jurisdiction of a court or forum other than the Court of Chancery of the State of Delaware, or for which the Court of Chancery of the State of Delaware does not have subject matter jurisdiction. For instance, the provision would not apply to actions brought to enforce any liability or duty created by the Exchange Act or the rules and regulations thereunder. Our amended and restated certificate of incorporation also provides that any person or entity holding, purchasing or otherwise acquiring any interest in shares of our capital stock will be deemed to have notice of and to have consented to this choice of forum provision. It is possible that a court of law could rule that the choice of forum provision contained in our amended and restated certificate of incorporation is inapplicable or unenforceable if it is challenged in a proceeding or otherwise.

Our amended and restated bylaws provide that, unless the Corporation consents in writing to the selection of an alternative forum, to the fullest extent permitted by law, the federal district courts of the United States of America shall be the exclusive forum for the resolution of any complaint asserting a cause of action arising under the Securities Act of 1933, as amended, and that any person or entity purchasing or otherwise acquiring or holding any interest in shares of capital stock of the Corporation shall be deemed to have notice of and consented to such provision.

Amendment of Charter Provisions

The amendment of any of the above provisions, except for the provision making it possible for our board of directors to issue preferred stock and the provision prohibiting cumulative voting, would require approval by holders of at least two-thirds in voting power of the outstanding shares of stock entitled to vote thereon.

Section 203 of the Delaware General Corporation Law

We are subject to Section 203 of the General Corporation Law of the State of Delaware (the “DGCL”), which prohibits persons deemed to be “interested stockholders” from engaging in a “business combination” with a publicly held Delaware corporation for three years following the date these persons become interested stockholders unless the business combination is, or the transaction in which the person became an interested stockholder was, approved in a prescribed manner or another prescribed exception applies. Generally, an “interested stockholder” is a person who, together with affiliates and associates, owns, or within three years prior to the determination of interested stockholder status did own, 15% or more of a corporation’s voting stock. Generally, a “business combination” includes a merger, asset or stock sale, or other transaction resulting in a financial benefit to the interested stockholder. The existence of this provision may have an anti-takeover effect with respect to transactions not approved in advance by our board of directors.

Exhibit 10.1

Certain information marked as [***] has been excluded from this exhibit because it is both (i) not material and (ii) would be competitively harmful if publicly disclosed.

PRECISION BIOSCIENCES, INC.

ELO LIFE SYSTEMS, INC.

LOAN AND SECURITY AGREEMENT

This LOAN AND SECURITY AGREEMENT (the "Agreement") is entered into as of May 15, 2019, by and between PACIFIC WESTERN BANK, a California state chartered bank ("Bank") and PRECISION BIOSCIENCES, INC., a Delaware corporation ("Parent"), and ELO LIFE SYSTEMS, INC., a Delaware corporation ("ELO" and together with Parent, individually and collectively, jointly and severally, "Borrower").

RECITALS

Borrower wishes to obtain credit from time to time from Bank, and Bank desires to extend credit to Borrower. This Agreement sets forth the terms on which Bank will advance credit to Borrower, and Borrower will repay the amounts owing to Bank.

AGREEMENT

The parties agree as follows:

1. DEFINITIONS AND CONSTRUCTION.

1.1 Definitions. As used in this Agreement, all capitalized terms shall have the definitions set forth on Exhibit A. Any term used in the Code and not defined herein shall have the meaning given to the term in the Code.

1.2 Accounting Terms. Any accounting term not specifically defined on Exhibit A shall be construed in accordance with GAAP and all calculations shall be made in accordance with GAAP (except for non-compliance with FAS 123R in monthly reporting). The term "financial statements" shall include the accompanying notes and schedules.

2. LOAN AND TERMS OF PAYMENT.

2.1 Credit Extensions.

(a) Promise to Pay. Borrower promises to pay to Bank, in lawful money of the United States of America, the aggregate unpaid principal amount of all Credit Extensions made by Bank to Borrower, together with interest on the unpaid principal amount of such Credit Extensions at rates in accordance with the terms hereof.

(b) Advances Under Revolving Line.

(i) Amount. Subject to and upon the terms and conditions of this Agreement, Borrower may request Advances in an aggregate outstanding principal amount not to exceed the Revolving Line. Amounts borrowed pursuant to this Section 2.1(b) may be repaid and reborrowed at any time prior to the Revolving Maturity Date, at which time all Advances under this Section 2.1(b) shall be immediately due and payable. Borrower may prepay any Advances without penalty or premium at any time.

(ii) Form of Request. Whenever Borrower desires an Advance, Borrower will notify Bank (which notice shall be irrevocable) by facsimile transmission or email no later than 3:30 p.m. Eastern time (2:30 p.m. Eastern time for wire transfers), on the Business

Day that the Advance is to be made. Each such notification shall be given by a Loan Advance/Paydown Request Form in substantially the form of Exhibit C. Bank is authorized to make Advances under this Agreement, based upon instructions received from an Authorized Officer, or without instructions if in Bank's discretion such Advances are necessary to meet Obligations which have become due and remain unpaid. Bank shall be entitled to rely on any notice given by a person whom Bank reasonably believes to be an Authorized Officer, and Borrower shall indemnify and hold Bank harmless for any damages, loss, costs and expenses suffered by Bank as a result of such reliance. Bank will credit the amount of Advances made under this Section 2.1(b) to Borrower's deposit account.

(c) Usage of Credit Card Services Under the Credit Card Line.

(i) Usage Period. Subject to and upon the terms and conditions of this Agreement, at any time from the Closing Date through the Credit Card Maturity Date, Borrower may use the Credit Card Services (as defined below) in amounts and upon terms as provided in Section 2.1(c)(ii) below.

(ii) Credit Card Services. Subject to and upon the terms and conditions of this Agreement, Borrower may request corporate credit cards and standard and e-commerce merchant account services from Bank (collectively, the "Credit Card Services"). The aggregate limit of the corporate credit cards and merchant credit card processing reserves shall not exceed the Credit Card Line. The terms and conditions (including repayment and fees) of such Credit Card Services shall be subject to the terms and conditions of Bank's standard forms of application and agreement for the Credit Card Services, which Borrower hereby agrees to execute.

(iii) Collateralization of Obligations Extending Beyond Maturity. If Borrower has not cash secured its obligations with respect to any Credit Card Services by the Credit Card Maturity Date, then, effective as of such date, the balance in any deposit accounts held by Bank and the certificates of deposit or time deposit accounts issued by Bank in Borrower's name (and any interest paid thereon or proceeds thereof, including any amounts payable upon the maturity or liquidation of such certificates or accounts), shall automatically secure such obligations to the extent of the then continuing or outstanding Credit Card Services. Borrower authorizes Bank to hold such balances in pledge and to decline to honor any drafts thereon or any requests by Borrower or any other Person to pay or otherwise transfer any part of such balances for so long as the applicable Credit Card Services are outstanding or continue.

2.2 Overadvances. If the aggregate amount of the outstanding Advances exceeds the Revolving Line at any time, Borrower shall immediately pay to Bank, in cash, the amount of such excess.

2.3 Interest Rates, Payments, and Calculations.

(a) Interest Rates.

(i) Advances. Except as set forth in Section 2.3(b), the Advances shall bear interest, on the outstanding daily balance thereof, at a variable annual rate equal to (1) at all times when Borrower maintains a daily balance of Cash in its demand deposit

accounts at Bank of at least $25,000,000, the greater of (A) 1.25% below the Prime Rate then in effect, or (B) 4.25%; and (2) at all times when Borrower does not maintain a daily balance of Cash in demand deposit accounts at Bank of at least $25,000,000, the greater of: (A) 0.25% above the Prime Rate then in effect; or (B) 5.75%.

(b) Late Fee; Default Rate. If any payment is not made within 15 days after the date such payment is due, Borrower shall pay Bank a late fee equal to the lesser of (i) 5% of the amount of such unpaid amount or (ii) the maximum amount permitted to be charged under applicable law. All Obligations shall bear interest, from and after the occurrence and during the continuance of an Event of Default, at a rate equal to 3 percentage points above the interest rate applicable immediately prior to the occurrence of the Event of Default.

(c) Payments. Interest under the Revolving Line shall be due and payable on the first calendar day of each month during the term hereof. Borrower authorizes Bank to, at its option, charge such interest, all Bank Expenses, all Periodic Payments, and any other amounts due and owing in accordance with the terms of this Agreement against any of Borrower's deposit accounts or against the Revolving Line, in which case those amounts shall thereafter accrue interest at the rate then applicable hereunder. Any interest not paid when due shall be compounded by becoming a part of the Obligations, and such interest shall thereafter accrue interest at the rate then applicable hereunder.

(d) Computation. In the event the Prime Rate is changed from time to time hereafter, the applicable rate of interest hereunder shall be increased or decreased, effective as of the day the Prime Rate is changed, by an amount equal to such change in the Prime Rate. All interest chargeable under the Loan Documents shall be computed on the basis of a 360-day year for the actual number of days elapsed.

2.4 Crediting Payments. Prior to the occurrence of an Event of Default, Bank shall credit a wire transfer of funds, check or other item of payment to such deposit account or Obligation as Borrower specifies. After the occurrence and during the continuance of an Event of Default, Bank shall have the right, in its sole discretion, to immediately apply any wire transfer of funds, check, or other item of payment Bank may receive to conditionally reduce Obligations, but such applications of funds shall not be considered a payment on account unless such payment is of immediately available federal funds or unless and until such check or other item of payment is honored when presented for payment. Notwithstanding anything to the contrary contained herein, any wire transfer or payment received by Bank after 5:30 p.m. Eastern time shall be deemed to have been received by Bank as of the opening of business on the immediately following Business Day. Whenever any payment to Bank under the Loan Documents would otherwise be due (except by reason of acceleration) on a date that is not a Business Day, such payment shall instead be due on the next Business Day, and additional fees or interest, as the case may be, shall accrue and be payable for the period of such extension.

2.5 Fees. Borrower shall pay to Bank the following:

(a) Facility Fee. On or before the Closing Date, a fee equal to $25,000, which shall be nonrefundable;

(b) **Bank Expenses**. On the Closing Date, all Bank Expenses incurred through the Closing Date, and, after the Closing Date, all Bank Expenses, as and when they become due.

(c) **Early Termination Fee**. If this Agreement is terminated prior to the Revolving Maturity Date, a fee (the "Early Termination Fee") in an amount equal to one percent (1.00%) of the Revolving Line.

(d) **Unused Fee**. A fee, payable quarterly in arrears one Business Day after each quarter and on the Revolving Maturity Date, in an amount equal to 0.50% per annum of the unused portion of the Revolving Line during such quarter, measured daily and averaged over such quarter, as determined by Bank. Notwithstanding the foregoing, the unused fee shall be waived for any quarter in which Borrower maintains a daily balance of Cash in its demand deposit accounts at Bank of at least $25,000,000 at all times during such quarter.

2.6 **Term**. This Agreement shall become effective on the Closing Date and, subject to Section 12.7, shall continue in full force and effect for so long as any Obligations remain outstanding or Bank has any obligation to make Credit Extensions under this Agreement. Notwithstanding the foregoing, Bank shall have the right to terminate its obligation to make Credit Extensions under this Agreement immediately and without notice upon the occurrence and during the continuance of an Event of Default.

3. CONDITIONS OF LOANS.

3.1 **Conditions Precedent to Closing**. The agreement of Bank to enter into this Agreement on the Closing Date is subject to the condition precedent that Bank shall have received, in form and substance satisfactory to Bank, each of the following items and completed each of the following requirements:

(a) this Agreement;

(b) an officer's certificate of Borrower with respect to incumbency and resolutions authorizing the execution and delivery of this Agreement;

(c) a financing statement (Form UCC-1);

(d) the certificates for the Shares, together with Assignments separate from Certificates, duly executed by the pledgor in blank;

(e) payment of the fees and Bank Expenses then due specified in Section 2.5, which may be debited from any of Borrower's accounts with Bank;

(f) current SOS Reports indicating that except for Permitted Liens, there are no other security interests or Liens of record in the Collateral;

(g) current financial statements, including audited statements for Borrower's most recently ended fiscal year, together with an unqualified opinion (or an opinion qualified only for going concern so long as Borrower's investors provide additional equity as

needed), company prepared consolidated and consolidating balance sheets, income statements, and statements of cash flows for the most recently ended month in accordance with Section 6.2, and such other updated financial information as Bank may reasonably request;

(h) a current Compliance Certificate in accordance with Section 6.2;

(i) evidence satisfactory to Bank that the insurance policies required by Section 6.5 hereof are in full force and effect, together with appropriate evidence showing loss payable and additional insured clauses or endorsements in favor of Bank,

(j) a Borrower Information Certificate for each Borrower;

(k) a Securities Account Control Agreement, duly executed by Bank, Borrower, and the applicable custodian;

(l) a legal opinion of Borrower's counsel, together with the duly executed signature thereto; and

(m) such other documents or certificates, and completion of such other matters, as Bank may reasonably request.

3.2 Conditions Precedent to all Credit Extensions. The obligation of Bank to make each Credit Extension, including the initial Credit Extension, is contingent upon Borrower's compliance with Section 3.1 above, and is further subject to the following conditions:

(a) timely receipt by Bank of the Loan Advance/Paydown Request Form as provided in Section 2.1;

(b) Borrower shall be in compliance with Section 6.6 hereof;

(c) in Bank's good faith sole discretion, there has not been a Material Adverse Effect; and

(d) the representations and warranties contained in Section 5 shall be true and correct in all material respects on and as of the date of such Loan Advance/Paydown Request Form and on the effective date of each Credit Extension as though made at and as of each such date, and no Event of Default shall have occurred and be continuing, or would exist after giving effect to such Credit Extension (provided, however, that those representations and warranties expressly referring to another date shall be true and correct in all material respects as of such date, and provided further that any representation or warranty that contains a materiality qualification therein shall be true and correct in all respects). The making of each Credit Extension shall be deemed to be a representation and warranty by Borrower on the date of such Credit Extension as to the accuracy of the facts referred to in this Section 3.2.

3.3 Covenant to Deliver.

(a) Except as otherwise provided in Section 3.3(b), Borrower agrees to deliver to Bank each item required to be delivered to Bank under this Agreement as a condition

precedent to any Credit Extension. Borrower expressly agrees that a Credit Extension made prior to the receipt by Bank of any such item shall not constitute a waiver by Bank of Borrower's obligation to deliver such item, and the making of any Credit Extension in the absence of a required item shall be in Bank's sole discretion.

(b) Unless otherwise provided in writing, within thirty (30) days after the Closing Date, Bank shall have received, in form and substance satisfactory to Bank:

(i) a landlord waiver with respect to Borrower's leased location at 302 East Pettigrew Street, Dibrell Building, Suite A-100, Durham, NC 27701, and a landlord or bailee waiver for each other location where Borrower maintains Collateral with an aggregate book value in excess of $250,000.

4. CREATION OF SECURITY INTEREST.

4.1 Grant of Security Interest. Borrower grants and pledges to Bank a continuing security interest in the Collateral to secure prompt repayment of any and all Obligations and to secure prompt performance by Borrower of each of its covenants and duties under the Loan Documents. Except for Permitted Liens or as disclosed in the Schedule, such security interest constitutes a valid, first-priority security interest in the presently existing Collateral, and will constitute a valid, first-priority security interest in later-acquired Collateral. Borrower also hereby agrees not to sell, transfer, assign, mortgage, pledge, lease, grant a security interest in, or encumber any of its Intellectual Property (other than through the licensing thereof to third parties pursuant to clause (b) of the definition of "Permitted Transfer"). Notwithstanding any termination of this Agreement or of any filings undertaken related to Bank's rights under the Code, Bank's Lien on the Collateral shall remain in effect for so long as any Obligations are outstanding.

4.2 Perfection of Security Interest. Borrower authorizes Bank to file at any time financing statements, continuation statements, and amendments thereto that (i) either specifically describe the Collateral or describe the Collateral as all assets of Borrower of the kind pledged hereunder, and (ii) contain any other information required by the Code for the sufficiency of filing office acceptance of any financing statement, continuation statement, or amendment, including whether Borrower is an organization, the type of organization and any organizational identification number issued to Borrower, if applicable. Borrower shall have possession of the Collateral, except where expressly otherwise provided in this Agreement or where Bank chooses to perfect its security interest by possession in addition to the filing of a financing statement. Where Collateral is in possession of a third party bailee, Borrower shall take such steps as Bank reasonably requests for Bank to (i) subject to Section 7.11 below, obtain an acknowledgment, in form and substance satisfactory to Bank, of the bailee that the bailee holds such Collateral for the benefit of Bank, and (ii) obtain "control" of any Collateral consisting of investment property, deposit accounts, letter-of-credit rights or electronic chattel paper (as such items and the term "control" are defined in Revised Article 9 of the Code) by causing the securities intermediary or depositary institution or issuing bank to execute a control agreement in form and substance satisfactory to Bank. Borrower will not create any chattel paper without placing a legend on the chattel paper acceptable to Bank indicating that Bank has a security interest in the chattel paper. Borrower from time to time may deposit with Bank specific cash collateral to secure specific Obligations; Borrower authorizes Bank to hold such specific balances in pledge and to decline to

honor any drafts thereon or any request by Borrower or any other Person to pay or otherwise transfer any part of such balances for so long as the specific Obligations are outstanding. If Borrower shall acquire a commercial tort claim in excess of $250,000 (for any single claim or related claims), Borrower shall promptly notify Bank in a writing signed by Borrower of the general details thereof and grant to Bank in such writing a security interest therein and in the proceeds thereof, all upon the terms of this Agreement, with such writing to be in form and substance reasonably satisfactory to Bank. Borrower shall take such other actions as Bank reasonably requests to perfect its security interests granted under this Agreement.

4.3 Pledge of Collateral. Borrower hereby pledges, assigns and grants to Bank a security interest in all the Shares, together with all proceeds and substitutions thereof, all cash, stock and other moneys and property paid thereon, all rights to subscribe for securities declared or granted in connection therewith, and all other cash and noncash proceeds of the foregoing, as security for the performance of the Obligations. On the Closing Date, the certificate or certificates for the Shares will be delivered to Bank, accompanied by an instrument of assignment duly governing the Shares. Borrower shall cause the books of each entity whose Shares are part of the Collateral and any transfer agent to reflect the pledge of the Shares. Upon the occurrence of an Event of Default hereunder, Bank may effect the transfer of any securities included in the Collateral (including but not limited to the Shares) into the name of Bank and cause new certificates representing such securities to be issued in the name of Bank or its transferee. Unless an Event of Default shall have occurred and be continuing, Borrower shall be entitled to exercise any voting rights with respect to the Shares and to give consents, waivers and ratifications in respect thereof, provided that no vote shall be cast or consent, waiver or ratification given or action taken which would be inconsistent with any of the terms of this Agreement or which would constitute or create any violation of any of such terms. All such rights to vote and give consents, waivers and ratifications shall terminate upon notice from Bank to Borrower following the occurrence and during the continuance of an Event of Default.

5. REPRESENTATIONS AND WARRANTIES.

Borrower represents and warrants as follows:

5.1 Due Organization and Qualification. Borrower and each Subsidiary is duly existing under the laws of the state in which it is organized and qualified and licensed to do business in any state in which the conduct of its business or its ownership of property requires that it be so qualified, except where the failure to do so would not reasonably be expected to cause a Material Adverse Effect.

5.2 Due Authorization; No Conflict. The execution, delivery, and performance of the Loan Documents are within Borrower’s powers, have been duly authorized, and are not in conflict with nor constitute a breach of any provision contained in Borrower’s Certificate of Incorporation or Bylaws, nor will they constitute an event of default under any material agreement by which Borrower is bound. Borrower is not in default under any agreement by which it is bound, except to the extent such default would not reasonably be expected to cause a Material Adverse Effect.

5.3 Collateral. Borrower has rights in or the power to transfer the Collateral, and its title to the Collateral is free and clear of Liens, adverse claims, and restrictions on transfer or pledge except for Permitted Liens. Other than movable items of personal property such as laptop computers, all Collateral having an aggregate book value in excess of $100,000, is located solely in the Collateral States. All Inventory is in all material respects of good and merchantable quality, free from all material defects, except for Inventory for which adequate reserves have been made. Except as set forth in the Schedule, none of Borrower's Cash is maintained or invested with a Person other than Bank or Bank's affiliates.

5.4 Intellectual Property. Borrower is the sole owner of the Intellectual Property created or purchased by Borrower, except for licenses granted by Borrower to its customers in the ordinary course of business. To the best of Borrower's knowledge, each of the copyrights, trademarks and patents created or purchased by Borrower is valid and enforceable, and no part of the Intellectual Property created or purchased by Borrower has been judged invalid or unenforceable, in whole or in part, and no claim has been made to Borrower that any part of the Intellectual Property created or purchased by Borrower violates the rights of any third party except to the extent such claim would not reasonably be expected to cause a Material Adverse Effect.

5.5 Name; Location of Chief Executive Office. Except as disclosed in the Schedule, Borrower has not done business under any name other than that specified on the signature page hereof, and its exact legal name is as set forth in the first paragraph of this Agreement. The chief executive office of Borrower is located at the address indicated in Section 10 hereof.

5.6 Litigation. Except as set forth in the Schedule, there are no actions or proceedings pending by or against Borrower or any Subsidiary before any court or administrative agency in which a likely adverse decision would reasonably be expected to have a Material Adverse Effect.

5.7 No Material Adverse Change in Financial Statements. All consolidated and consolidating financial statements related to Borrower and any Subsidiary that are delivered by Borrower to Bank fairly present in all material respects Borrower's consolidated and consolidating financial condition as of the date thereof and Borrower's consolidated and consolidating results of operations for the period then ended. There has not been a material adverse change in the consolidated or in the consolidating financial condition of Borrower since the date of the most recent of such financial statements submitted to Bank.

5.8 Solvency, Payment of Debts. Borrower is able to pay its debts (including trade debts) as they mature; the fair saleable value of Borrower's assets (including goodwill minus disposition costs) exceeds the fair value of its liabilities; and Borrower is not left with unreasonably small capital after the transactions contemplated by this Agreement.

5.9 Compliance with Laws and Regulations. Borrower and each Subsidiary have met the minimum funding requirements of ERISA with respect to any employee benefit plans subject to ERISA. No event has occurred resulting from Borrower's failure to comply with ERISA that is reasonably likely to result in Borrower's incurring any liability that could have a Material Adverse Effect. Borrower is not an "investment company" or a company "controlled" by an

"investment company" within the meaning of the Investment Company Act of 1940. Borrower is not engaged principally, or as one of its important activities, in the business of extending credit for the purpose of purchasing or carrying margin stock (within the meaning of Regulations T and U of the Board of Governors of the Federal Reserve System). Borrower has not violated any statutes, laws, ordinances or rules applicable to it, the violation of which would reasonably be expected to have a Material Adverse Effect. Borrower and each Subsidiary have filed or caused to be filed all tax returns required to be filed, and have paid, or have made adequate provision for the payment of, all taxes reflected therein except those being contested in good faith with adequate reserves under GAAP or where the failure to file such returns or pay such taxes would not reasonably be expected to have a Material Adverse Effect.

5.10 Subsidiaries. Borrower does not own any stock, partnership interest or other equity securities of any Person, except for Permitted Investments.

5.11 Government Consents. Borrower and each Subsidiary have obtained all consents, approvals and authorizations of, made all declarations or filings with, and given all notices to, all governmental authorities that are necessary for the continued operation of Borrower's business as currently conducted, except where the failure to do so would not reasonably be expected to cause a Material Adverse Effect.

5.12 Inbound Licenses. Except as disclosed on the Schedule, and except for non-customized, "off-the-shelf" licenses, Borrower is not a party to, nor is bound by, any material license or other agreement important for the conduct of Borrower's business that prohibits or otherwise restricts Borrower from granting a security interest in Borrower's interest in such license or agreement or any other property important for the conduct of Borrower's business, other than this Agreement or the other Loan Documents.

5.13 Shares. Borrower has full power and authority to create a first lien on the Shares, and no disability or contractual obligations exists that would prohibit Borrower from pledging the Shares pursuant to this Agreement. To Borrower's knowledge, there are no subscriptions, warrants, rights of first refusal or other restrictions on transfer relative to, or options exercisable with respect to the Shares. The Shares have been and will remain duly authorized and validly issued, and are fully paid and non-assessable. To Borrower's knowledge, the Shares are not the subject of any present or threatened suit, action, arbitration, administrative or other proceeding, and Borrower knows of no reasonable grounds for the institution of any such proceedings.

5.14 Full Disclosure. No representation, warranty or other statement made by Borrower in any certificate or written statement furnished to Bank taken together with all such certificates and written statements furnished to Bank contains any untrue statement of a material fact or omits to state a material fact necessary in order to make the statements contained in such certificates or statements not misleading in light of the circumstances in which they were made, it being recognized by Bank that the projections and forecasts provided by Borrower in good faith and based upon reasonable assumptions are not to be viewed as facts and that actual results during the period or periods covered by any such projections and forecasts may differ from the projected or forecasted results.

6. AFFIRMATIVE COVENANTS.

Borrower covenants that, until payment in full of all outstanding Obligations, and for so long as Bank may have any commitment to make a Credit Extension hereunder, Borrower shall do all of the following:

6.1 Good Standing and Government Compliance. Borrower shall maintain its and each of its Subsidiaries' corporate existence and good standing in the respective states of formation, shall maintain qualification and good standing in each other jurisdiction in which the failure to so qualify would reasonably be expected to have a Material Adverse Effect, and shall furnish to Bank the organizational identification number issued to Borrower by the authorities of the state in which Borrower is organized, if applicable. Borrower shall meet, and shall cause each Subsidiary to meet, the minimum funding requirements of ERISA with respect to any employee benefit plans subject to ERISA. Borrower shall comply, and shall cause each Subsidiary to comply, with all statutes, laws, ordinances and government rules and regulations to which it is subject, and shall maintain, and shall cause each of its Subsidiaries to maintain, in force all licenses, approvals and agreements, the loss of which or failure to comply with which would reasonably be expected to have a Material Adverse Effect.

6.2 Financial Statements, Reports, Certificates, Collateral Audits.

(a) Borrower shall deliver to Bank: (i) as soon as available, but in any event within 30 days after the end of each calendar month, a company prepared consolidated and consolidating balance sheet, income statement, and statement of cash flows covering Borrower's operations during such period, in a form reasonably acceptable to Bank and certified by a Responsible Officer; (ii) as soon as available, but in any event within 180 days after the end of Borrower's fiscal year, audited consolidated and consolidating financial statements of Borrower prepared in accordance with GAAP, consistently applied, together with an opinion which is either unqualified, qualified only for going concern so long as Borrower's investors provide additional equity as needed (or qualified for going concern as a result of the scheduled occurrence of the Maturity Date), or otherwise consented to in writing by Bank on such financial statements of an independent certified public accounting firm reasonably acceptable to Bank; (iii) annual budget approved by Borrower's Board of Directors as soon as available but not later than 15 days after the end of each fiscal year during the term hereof; (iv) if applicable, copies of all statements, reports and notices sent or made available generally by Borrower to its security holders or to any holders of Subordinated Debt and all reports on Forms 10-K and 10-Q filed with the Securities and Exchange Commission; (v) promptly upon receipt of notice thereof, a report of any legal actions pending or threatened against Borrower or any Subsidiary that could reasonably be expected to result in damages or costs to Borrower or any Subsidiary of $500,000 or more; (vi) promptly upon receipt, each management letter prepared by Borrower's independent certified public accounting firm regarding Borrower's management control systems; and (vii) such budgets, sales projections, operating plans or other financial information as Bank may reasonably request from time to time.

(b) Within 30 days after the last day of each month, Borrower shall deliver to Bank detailed aged listings by invoice date of accounts receivable and accounts payable.

(c) Within 30 days after the last day of each month, Borrower shall deliver to Bank with the monthly financial statements a Compliance Certificate certified as of the last day of the applicable month and signed by a Responsible Officer in substantially the form of Exhibit D hereto.

(d) As soon as possible and in any event within 3 Business Days after becoming aware of the occurrence or existence of an Event of Default hereunder, a written statement of a Responsible Officer setting forth details of the Event of Default, and the action which Borrower has taken or proposes to take with respect thereto.

(e) Bank (through any of its officers, employees, or agents) shall have the right, upon reasonable prior notice, from time to time during Borrower's usual business hours but no more than once a year (unless an Event of Default has occurred and is continuing), to inspect Borrower's Books and to make copies thereof and to check, test, inspect, audit and appraise the Collateral at Borrower's expense in order to verify Borrower's financial condition or the amount, condition of, or any other matter relating to, the Collateral.

(f) Borrower shall deliver to Bank, promptly following the end of each calendar quarter, quarterly strategic business updates in a form satisfactory to Bank.

Borrower may deliver to Bank on an electronic basis any certificates, reports or information required pursuant to this Section 6.2, and Bank shall be entitled to rely on the information contained in the electronic files, provided that Bank in good faith believes that the files were delivered by a Responsible Officer. Borrower shall include a submission date on any certificates and reports to be delivered electronically.

6.3 Inventory and Equipment; Returns. Borrower shall keep all Inventory and Equipment in good and merchantable condition, ordinary wear and tear excepted, free from all material defects except for Inventory and Equipment (i) sold in the ordinary course of business, and (ii) for which adequate reserves have been made, in all cases in the United States and such other locations as to which Borrower gives prior written notice. Returns and allowances, if any, as between Borrower and its account debtors shall be on the same basis and in accordance with the usual customary practices of Borrower, as they exist on the Closing Date. Borrower shall promptly notify Bank of all returns and recoveries and of all disputes and claims involving inventory having a book value of more than $250,000.

6.4 Taxes. Borrower shall make, and cause each Subsidiary to make, due and timely payment or deposit of all material federal, state, and local taxes, assessments, or contributions required of it by law, including, but not limited to, those laws concerning income taxes, F.I.C.A., F.U.T.A. and state disability, and will execute and deliver to Bank, on demand, proof satisfactory to Bank indicating that Borrower or a Subsidiary has made such payments or deposits and any appropriate certificates attesting to the payment or deposit thereof; provided that Borrower or a Subsidiary need not make any payment if the amount or validity of such payment is contested in good faith by appropriate proceedings and is reserved against (to the extent required by GAAP) by Borrower or such Subsidiary.

6.5 Insurance. Borrower, at its expense, shall (i) keep the Collateral insured against loss or damage, and (ii) maintain liability and other insurance, in each case as ordinarily insured against by other owners in businesses similar to Borrower's. All such policies of insurance shall be in such form, with such companies, and in such amounts as reasonably satisfactory to Bank. All policies of property insurance shall contain a lender's loss payable endorsement, in a form satisfactory to Bank, showing Bank as lender's loss payee. All liability insurance policies shall show, or have endorsements showing, Bank as an additional insured. Any such insurance policies shall specify that the insurer must give at least 20 days' notice to Bank before canceling its policy for any reason. Within 30 days of the Closing Date, Borrower shall cause to be furnished to Bank a copy of its policies including any endorsements covering Bank or showing Bank as an additional insured. Upon Bank's request, Borrower shall deliver to Bank certified copies of the policies of insurance and evidence of all premium payments. Proceeds payable under any casualty policy will, at Borrower's option, be payable to Borrower to replace the property subject to the claim, provided that any such replacement property shall be deemed Collateral in which Bank has been granted a first priority security interest, provided that if an Event of Default has occurred and is continuing, all proceeds payable under any such policy shall, at Bank's option, be payable to Bank to be applied on account of the Obligations.

6.6 Primary Depository. At all times when the aggregate balance of Borrower's Cash at Bank and Bank's affiliates is less than the Deposit Account Threshold, Borrower shall maintain, and shall cause all of its Subsidiaries to maintain, all depository and operating accounts with Bank and all investment accounts with Bank or Bank's affiliates. At all times when the aggregate balance of Borrower's Cash at Bank and Bank's affiliates equals or exceeds the Deposit Account Threshold, Borrower and its Subsidiaries may maintain Cash balances that exceed the Deposit Account Threshold in depository, operating, and investments accounts outside of Bank or Bank's affiliates, so long as each such account outside of Bank is subject to a duly-executed account control agreement in favor of Bank, and in form and substance reasonably satisfactory to Bank. Prior to Borrower maintaining any investment accounts with Bank's affiliates, Borrower, Bank, and any such affiliate shall have entered into a securities account control agreement with respect to any such investment accounts, in form and substance reasonably satisfactory to Bank.

6.7 Financial Covenants. Borrower shall at all times maintain the following financial ratios and covenants:

(a) Minimum Cash. At all times, an aggregate balance of Cash at Bank and Bank's Affiliates (excluding any amounts held in Excluded Accounts) equal to or greater than the aggregate outstanding amount of Obligations. Borrower acknowledges and agrees that any request by Borrower or any other Person to pay or otherwise transfer funds that would cause Borrower's balance of Cash at Bank to be less than the amount required pursuant to this Section 6.7(a) shall constitute an Event of Default under this Agreement.

6.8 Intellectual Property.

(a) Borrower shall promptly give Bank written notice of any applications or registrations of intellectual property rights filed with the United States Patent and

Trademark Office, including the date of such filing and the registration or application numbers, if any.

(b) Borrower shall use commercially reasonably efforts to (i) protect, defend and maintain the validity and enforceability of the trade secrets, Trademarks, Patents and Copyrights, (ii) use commercially reasonable efforts to detect infringements of the Trademarks, Patents and Copyrights and promptly advise Bank in writing of material infringements detected, and (iii) not allow any material Trademarks, Patents or Copyrights to be abandoned, forfeited or dedicated to the public without the written consent of Bank, which shall not be unreasonably withheld.

6.9 Consent of Inbound Licensors. Prior to entering into or becoming bound by any material inbound license or agreement (other than non-customized, "off-the-shelf" licenses), Borrower shall: (i) provide written notice to Bank of the material terms of such license or agreement with a description of its likely impact on Borrower's business or financial condition; and (ii) in good faith use commercially reasonable efforts to obtain the consent of, or waiver by, any person whose consent or waiver is necessary for Borrower's interest in such licenses or contract rights to be deemed Collateral and for Bank to have a security interest in it that might otherwise be restricted by the terms of the applicable license or agreement, whether now existing or entered into in the future, provided, however, that the failure to obtain any such consent or waiver shall not constitute a default under this Agreement.

6.10 Creation/Acquisition of Subsidiaries. In the event any Borrower or any Subsidiary of any Borrower creates or acquires any Subsidiary, Borrower or such Subsidiary shall promptly notify Bank of such creation or acquisition, and Borrower or such Subsidiary shall take all actions reasonably requested by Bank to achieve any of the following with respect to such "***New Subsidiary***" (defined as a Subsidiary formed after the date hereof during the term of this Agreement): (i) to cause New Subsidiary to become either a co-Borrower or a secured guarantor with respect to the Obligations hereunder, if such New Subsidiary is organized under the laws of the United States; and (ii) to grant and pledge to Bank a perfected security interest in 100% of the stock, units or other evidence of ownership held by Borrower or its Subsidiaries of any such New Subsidiary which is organized under the laws of the United States, and 65% of the stock, units or other evidence of ownership held by Borrower or its Subsidiaries of any such New Subsidiary which is not organized under the laws of the United States.

6.11 Further Assurances. At any time and from time to time Borrower shall execute and deliver such further instruments and take such further action as may reasonably be requested by Bank to effect the purposes of this Agreement.

7. NEGATIVE COVENANTS.

Borrower covenants and agrees that, so long as any credit hereunder shall be available and until the outstanding Obligations are paid in full or for so long as Bank may have any commitment to make any Credit Extensions, Borrower will not do any of the following without Bank's prior written consent, which shall not be unreasonably withheld:

7.1 Dispositions. Convey, sell, lease, license, transfer or otherwise dispose of (collectively, to "Transfer"), or permit any of its Subsidiaries to Transfer, all or any part of its business or property, or move cash balances on deposit with Bank to accounts opened at another financial institution, other than Permitted Transfers.

7.2 Change in Name, Location, Executive Office, or Executive Management; Change in Business; Change in Fiscal Year; Change in Control. Change its name or the state of Borrower's formation or relocate its chief executive office without 30 days prior written notification to Bank; replace or suffer the departure of its chief executive officer or chief financial officer without delivering written notification to Bank within 10 days; fail to appoint an interim replacement or fill a vacancy in the position of chief executive officer or chief financial officer for more than 30 consecutive days; suffer a change on Parent's board of directors which results in the failure of at least one partner of venBio (or its Affiliates) to serve as a voting member without the prior written consent of Bank, which may be withheld in Bank's sole discretion; take action to liquidate, wind up, or otherwise cease to conduct business in the ordinary course; engage in any business, or permit any of its Subsidiaries to engage in any business, other than or reasonably related or incidental to the businesses currently engaged in by Borrower; change its fiscal year end; have a Change in Control.

7.3 Mergers or Acquisitions. Merge or consolidate, or permit any of its Subsidiaries to merge or consolidate, with or into any other business organization (other than mergers or consolidations of a Subsidiary into another Subsidiary or into Borrower), or acquire, or permit any of its Subsidiaries to acquire, all or substantially all of the capital stock or property of another Person except where (a) each of the following conditions is applicable: (i) the consideration paid in connection with such transactions (including assumption of liabilities) does not in the aggregate exceed $500,000 during any fiscal year, (ii) no Event of Default has occurred, is continuing or would exist after giving effect to such transactions, (iii) such transactions do not result in a Change in Control, and (iv) Borrower is the surviving entity; or (b) the Obligations are repaid in full concurrently with the closing of any merger or consolidation of Borrower in which Borrower is not the surviving entity; provided, however, that Borrower shall not, without Bank's prior written consent, enter into any binding contractual arrangement with any Person to attempt to facilitate a merger or acquisition of Borrower, unless (i) no Event of Default exists when such agreement is entered into by Borrower, (ii) such agreement does not give such Person the right to claim any fee, payment or damages from any parties, other than from Borrower or Borrower's investors, in connection with a sale of Borrower's stock or assets pursuant to or resulting from an assignment for the benefit of creditors, an asset turnover to Borrower's creditors (including, without limitation, Bank), foreclosure, bankruptcy or similar liquidation, and (iii) Borrower notifies Bank in advance of entering into such an agreement (provided, the failure to give such notification shall not be deemed a material breach of this Agreement).

7.4 Indebtedness. Create, incur, assume, guarantee or be or remain liable with respect to any Indebtedness, or permit any Subsidiary so to do, other than Permitted Indebtedness, or prepay any Indebtedness or take any actions which impose on Borrower an obligation to prepay any Indebtedness, except Indebtedness to Bank.

7.5 Encumbrances. Create, incur, assume or allow any Lien with respect to its property, or assign or otherwise convey any right to receive income, including the sale of any

Accounts, or permit any of its Subsidiaries so to do, except for Permitted Liens, or covenant to any other Person (other than (i) the licensors of in-licensed property with respect to such property or (ii) the lessors of specific equipment or lenders financing specific equipment with respect to such leased or financed equipment) that Borrower in the future will refrain from creating, incurring, assuming or allowing any Lien with respect to any of Borrower's property.

7.6 Distributions. Pay any dividends or make any other distribution or payment on account of or in redemption, retirement or purchase of any capital stock, except that Borrower may (i) repurchase the stock of former employees or directors pursuant to stock repurchase agreements in an aggregate amount not to exceed $500,000 in any fiscal year, as long as an Event of Default does not exist prior to such repurchase or would not exist after giving effect to such repurchase, and (ii) repurchase the stock of former employees or directors pursuant to stock repurchase agreements by the cancellation of indebtedness owed by such former employees or directors to Borrower regardless of whether an Event of Default exists.

7.7 Investments. Directly or indirectly acquire or own an Investment in, or make any Investment in or to any Person, or permit any of its Subsidiaries so to do, other than Permitted Investments, or maintain or invest any of its investment property with a Person other than Bank or permit any Subsidiary to do so unless such Person has entered into a control agreement with Bank, in form and substance satisfactory to Bank, or suffer or permit any Subsidiary to be a party to, or be bound by, an agreement that restricts such Subsidiary from paying dividends or otherwise distributing property to Borrower.

7.8 Capitalized Expenditures. Make Capitalized Expenditures in excess of Forty Million Dollars ($40,000,000) in the aggregate during each fiscal year of Borrower.

7.9 Transactions with Affiliates. Directly or indirectly enter into or permit to exist any material transaction with any Affiliate of Borrower except for (i) transactions that are in the ordinary course of Borrower's business, upon fair and reasonable terms that are no less favorable to Borrower than would be obtained in an arm's length transaction with a non-affiliated Person, and (ii) the sale of Borrower's equity securities in bona fide transactions with Borrower's existing investors that do not result in a Change in Control.

7.10 Subordinated Debt. Make any payment in respect of any Subordinated Debt, or permit any of its Subsidiaries to make any such payment, except in compliance with the terms of such Subordinated Debt, or amend any provision affecting Bank's rights contained in any documentation relating to the Subordinated Debt without Bank's prior written consent.

7.11 Inventory and Equipment. Store the Inventory or the Equipment of an aggregate book value in excess of $500,000 with a bailee, warehouseman, collocation facility or similar third party unless the third party has been notified of Bank's security interest and Bank (a) has received an acknowledgment from the third party that it is holding or will hold the Inventory or Equipment for Bank's benefit or (b) is in possession of the warehouse receipt, where negotiable, covering such Inventory or Equipment. Except for Inventory sold in the ordinary course of business and for movable items of personal property having an aggregate book value not in excess of $200,000, and except for such other locations as Bank may approve in writing, Borrower shall keep the Inventory and Equipment only at the location set forth in Section 10 and such other

locations of which Borrower gives Bank prior written notice and as to which Bank is able to take such actions as may be necessary to perfect its security interest or to obtain a bailee's acknowledgment of Bank's rights in the Collateral.

7.12 No Investment Company; Margin Regulation. Become or be controlled by an "investment company," within the meaning of the Investment Company Act of 1940, or become principally engaged in, or undertake as one of its important activities, the business of extending credit for the purpose of purchasing or carrying margin stock, or use the proceeds of any Credit Extension for such purpose.

8. EVENTS OF DEFAULT.

Any one or more of the following events shall constitute an Event of Default by Borrower under this Agreement:

8.1 Payment Default. If Borrower fails to pay any of the Obligations when due;

8.2 Covenant Default.

(a) If Borrower fails to perform any obligation under Sections 6.2 (financial reporting), 6.4 (taxes), 6.5 (insurance), 6.6 (primary accounts), or 6.7 (financial covenants), or violates any of the covenants contained in Article 7 of this Agreement; or

(b) If Borrower fails or neglects to perform or observe any other material term, provision, condition, covenant contained in this Agreement, in any of the Loan Documents, or in any other present or future agreement between Borrower and Bank and as to any default under such other term, provision, condition or covenant that can be cured, has failed to cure such default within 15 days after Borrower receives notice thereof or any officer of Borrower becomes aware thereof; provided, however, that if the default cannot by its nature be cured within the 15 day period or cannot after diligent attempts by Borrower be cured within such 15 day period, and such default is likely to be cured within a reasonable time, then Borrower shall have an additional reasonable period (which shall not in any case exceed 30 days) to attempt to cure such default, and within such reasonable time period the failure to have cured such default shall not be deemed an Event of Default but no Credit Extensions will be made;

8.3 Material Adverse Change. If there occurs any circumstance or any circumstances which would reasonably be expected to have a Material Adverse Effect;

8.4 Attachment. If any material portion of Borrower's assets is attached, seized, subjected to a writ or distress warrant, or is levied upon, or comes into the possession of any trustee, receiver or person acting in a similar capacity and such attachment, seizure, writ or distress warrant or levy has not been removed, discharged or rescinded within 10 days, or if Borrower is enjoined, restrained, or in any way prevented by court order from continuing to conduct all or any material part of its business affairs, or if a judgment or other claim becomes a lien or encumbrance upon any material portion of Borrower's assets, or if a notice of lien, levy, or assessment is filed of record with respect to any material portion of Borrower's assets by the United States Government, or any department, agency, or instrumentality thereof, or by any state, county,

municipal, or governmental agency, and the same is not paid within ten days after Borrower receives notice thereof, provided that none of the foregoing shall constitute an Event of Default where such action or event is stayed or an adequate bond has been posted pending a good faith contest by Borrower (provided that no Credit Extensions will be made during such cure period);

8.5 Insolvency. If Borrower becomes insolvent, or if an Insolvency Proceeding is commenced by Borrower, or if an Insolvency Proceeding is commenced against Borrower and is not dismissed or stayed within 45 days (provided that no Credit Extensions will be made prior to the dismissal of such Insolvency Proceeding);

8.6 Other Agreements. If (a) there is a default or other failure to perform in any agreement to which Borrower is a party with a third party or parties (i) resulting in a right by such third party or parties, whether or not exercised, to accelerate the maturity of any Indebtedness in an amount in excess of $500,000, (ii) in connection with any lease of real property material to the conduct of Borrower's business, if such default or failure to perform gives another party the right to terminate the lease, or (iii) that would reasonably be expected to have a Material Adverse Effect, or (b) any default or event of default (however designated) shall occur with respect to any Subordinated Debt which is not cured within any applicable cure period;

8.7 Judgments. If a final, uninsured judgment or judgments for the payment of money in an amount, individually or in the aggregate, of at least $500,000 shall be rendered against Borrower and shall remain unsatisfied and unstayed for a period of 10 days (provided that no Credit Extensions will be made prior to the satisfaction or stay of the judgment); or

8.8 Misrepresentations. If any material misrepresentation or material misstatement exists now or hereafter in any warranty or representation set forth herein or in any certificate delivered to Bank by any Responsible Officer pursuant to this Agreement or to induce Bank to enter into this Agreement or any other Loan Document.

9. BANK'S RIGHTS AND REMEDIES.

9.1 Rights and Remedies. Upon the occurrence and during the continuance of an Event of Default, Bank may, at its election, without notice of its election and without demand, do any one or more of the following, all of which are authorized by Borrower:

(a) Declare all Obligations, whether evidenced by this Agreement, by any of the other Loan Documents, or otherwise, immediately due and payable (provided that upon the occurrence of an Event of Default described in Section 8.5 (insolvency), all Obligations shall become immediately due and payable without any action by Bank);

(b) Demand that Borrower (i) deposit cash with Bank in an amount equal to the amount of any Letters of Credit remaining undrawn, as collateral security for the repayment of any future drawings under such Letters of Credit, and (ii) pay in advance all Letter of Credit fees scheduled to be paid or payable over the remaining term of the Letters of Credit, and Borrower shall promptly deposit and pay such amounts;

(c) Cease advancing money or extending credit to or for the benefit of Borrower under this Agreement or under any other agreement between Borrower and Bank;

(d) Settle or adjust disputes and claims directly with account debtors for amounts, upon terms and in whatever order that Bank reasonably considers advisable;

(e) Make such payments and do such acts as Bank considers necessary or reasonable to protect its security interest in the Collateral. Borrower agrees to assemble the Collateral if Bank so requires, and to make the Collateral available to Bank as Bank may designate. Borrower authorizes Bank to enter the premises where the Collateral is located, to take and maintain possession of the Collateral, or any part of it, and to pay, purchase, contest, or compromise any encumbrance, charge, or lien which in Bank's determination appears to be prior or superior to its security interest and to pay all expenses incurred in connection therewith. With respect to any of Borrower's owned premises, Borrower hereby grants Bank a license to enter into possession of such premises and to occupy the same, without charge, in order to exercise any of Bank's rights or remedies provided herein, at law, in equity, or otherwise;

(f) place a "hold" on any account maintained with Bank and not honor any presentment (including but not limited to checks, wires and ACH drafts) against such account at Bank and/or deliver a notice of exclusive control, any entitlement order, or other directions or instructions pursuant to any control agreement or similar agreements providing control of any Collateral;

(g) Set off and apply to the Obligations any and all (i) balances and deposits of Borrower held by Bank, and (ii) indebtedness at any time owing to or for the credit or the account of Borrower held by Bank;

(h) Ship, reclaim, recover, store, finish, maintain, repair, prepare for sale, advertise for sale, and sell (in the manner provided for herein) the Collateral. Bank is hereby granted a license or other right, solely pursuant to the provisions of this Section 9.1, to use, without charge, Borrower's labels, patents, copyrights, rights of use of any name, trade secrets, trade names, trademarks, service marks, and advertising matter, or any property of a similar nature, as it pertains to the Collateral, in completing production of, advertising for sale, and selling any Collateral and, in connection with Bank's exercise of its rights under this Section 9.1, Borrower's rights under all licenses and all franchise agreements shall inure to Bank's benefit;

(i) Sell the Collateral at either a public or private sale, or both, by way of one or more contracts or transactions, for cash or on terms, in such manner and at such places (including Borrower's premises) as Bank determines is commercially reasonable, and apply any proceeds to the Obligations in whatever manner or order Bank deems appropriate. Bank may sell the Collateral without giving any warranties as to the Collateral. Bank may specifically disclaim any warranties of title or the like. This procedure will not be considered adversely to affect the commercial reasonableness of any sale of the Collateral. If Bank sells any of the Collateral upon credit, Borrower will be credited only with payments actually made by the purchaser, received by Bank, and applied to the indebtedness of the purchaser. If the purchaser fails to pay for the Collateral, Bank may resell the Collateral and Borrower shall be credited with the proceeds of the sale;

(j) Bank may credit bid and purchase at any public sale;

(k) Apply for the appointment of a receiver, trustee, liquidator or conservator of the Collateral, without notice and without regard to the adequacy of the security for the Obligations and without regard to the solvency of Borrower, any guarantor or any other Person liable for any of the Obligations; and

(l) Any deficiency that exists after disposition of the Collateral as provided above will be paid immediately by Borrower.

Bank may comply with any applicable state or federal law requirements in connection with a disposition of the Collateral and compliance will not be considered adversely to affect the commercial reasonableness of any sale of the Collateral.

9.2 Power of Attorney. Effective only upon the occurrence and during the continuance of an Event of Default, Borrower hereby irrevocably appoints Bank (and any of Bank's designated officers, or employees) as Borrower's true and lawful attorney to: (a) send requests for verification of Accounts or notify account debtors of Bank's security interest in the Accounts; (b) endorse Borrower's name on any checks or other forms of payment or security that may come into Bank's possession; (c) sign Borrower's name on any invoice or bill of lading relating to any Account, drafts against account debtors, schedules and assignments of Accounts, verifications of Accounts, and notices to account debtors; (d) dispose of any Collateral; (e) make, settle, and adjust all claims under and decisions with respect to Borrower's policies of insurance; (f) settle and adjust disputes and claims respecting the accounts directly with account debtors, for amounts and upon terms which Bank determines to be reasonable; and (g) file, in its sole discretion, one or more financing or continuation statements and amendments thereto, relative to any of the Collateral; provided Bank may exercise such power of attorney to sign the name of Borrower on any of the documents described in clause (g) above, regardless of whether an Event of Default has occurred. The appointment of Bank as Borrower's attorney in fact, and each and every one of Bank's rights and powers, being coupled with an interest, is irrevocable until all of the Obligations have been fully repaid and performed and Bank's obligation to provide advances hereunder is terminated.

9.3 Accounts Collection. At any time after the occurrence and during the continuation of an Event of Default, Bank may notify any Person owing funds to Borrower of Bank's security interest in such funds and verify the amount of such Account. Borrower shall collect all amounts owing to Borrower for Bank, receive in trust all payments as Bank's trustee, and immediately deliver such payments to Bank in their original form as received from the account debtor, with proper endorsements for deposit.

9.4 Bank Expenses. If Borrower fails to pay any amounts or furnish any required proof of payment due to third persons or entities, as required under the terms of this Agreement, then Bank may do any or all of the following after reasonable notice to Borrower: (a) make payment of the same or any part thereof; and/or (b) set up such reserves under the Revolving Line as Bank deems necessary to protect Bank from the exposure created by such failure; or (c) obtain and maintain insurance policies of the type discussed in Section 6.5 of this Agreement, and take any action with respect to such policies as Bank deems prudent. Any amounts so paid or deposited by Bank shall constitute Bank Expenses, shall be immediately due and payable, and shall bear interest at the then applicable rate hereinabove provided, and shall be secured by the

Collateral. Any payments made by Bank shall not constitute an agreement by Bank to make similar payments in the future or a waiver by Bank of any Event of Default under this Agreement.

9.5 Bank's Liability for Collateral. Bank has no obligation to clean up or otherwise prepare the Collateral for sale. All risk of loss, damage or destruction of the Collateral shall be borne by Borrower.

9.6 No Obligation to Pursue Others. Bank has no obligation to attempt to satisfy the Obligations by collecting them from any other person liable for them and Bank may release, modify or waive any collateral provided by any other Person to secure any of the Obligations, all without affecting Bank's rights against Borrower. Borrower waives any right it may have to require Bank to pursue any other Person for any of the Obligations.

9.7 Remedies Cumulative. Bank's rights and remedies under this Agreement, the Loan Documents, and all other agreements shall be cumulative. Bank shall have all other rights and remedies not inconsistent herewith as provided under the Code, by law, or in equity. No exercise by Bank of one right or remedy shall be deemed an election, and no waiver by Bank of any Event of Default on Borrower's part shall be deemed a continuing waiver. No delay by Bank shall constitute a waiver, election, or acquiescence by it. No waiver by Bank shall be effective unless made in a written document signed on behalf of Bank and then shall be effective only in the specific instance and for the specific purpose for which it was given. Borrower expressly agrees that this Section 9.7 may not be waived or modified by Bank by course of performance, conduct, estoppel or otherwise.

9.8 Demand; Protest. Except as otherwise provided in this Agreement, Borrower waives demand, protest, notice of protest, notice of default or dishonor, notice of payment and nonpayment and any other notices relating to the Obligations.

10. NOTICES.

Unless otherwise provided in this Agreement, all notices or demands by any party relating to this Agreement or any other agreement entered into in connection herewith shall be in writing and (except for financial statements and other reporting required pursuant to Section 6.2 of this Agreement, which shall be sent as directed in the monthly reporting forms provided by Bank) shall be personally delivered or sent by a recognized overnight delivery service, certified mail, postage prepaid, return receipt requested, or by telefacsimile or electronic mail to Borrower or to Bank, as the case may be, at its addresses set forth below:

If to Borrower:	Precision Biosciences, Inc. ELO Life Systems, Inc. 302 East Pettigrew Street Dibrell Bldg., Suite A-100 Durham, NC 27701 Attn: Abid Ansari, VP Finance FAX: (____) E-Mail: abid.ansari@precisionbiosciences.com

If to Bank:	Pacific Western Bank 406 Blackwell Street, Suite 240 Durham, North Carolina 27701 Attn: Loan Operations Manager FAX: (919) 314-3080 E-Mail: loannotices@square1bank.com
with a copy to:	Pacific Western Bank 406 Blackwell Street, Suite 240 Durham, North Carolina 27701 Attn: Evan Travis FAX: (919) 314-3090

The parties hereto may change the address at which they are to receive notices hereunder, by notice in writing in the foregoing manner given to the other.

11. CHOICE OF LAW AND VENUE; JURY TRIAL WAIVER.

This Agreement shall be governed by, and construed in accordance with, the internal laws of the State of North Carolina, without regard to principles of conflicts of law. Jurisdiction shall lie in the State of North Carolina. All disputes, controversies, claims, actions and similar proceedings arising with respect to Borrower's account or any related agreement or transaction shall be brought in the General Court of Justice of North Carolina sitting in Durham County, North Carolina or the United States District Court for the Middle District of North Carolina, except as provided below with respect to arbitration of such matters. BANK AND BORROWER EACH ACKNOWLEDGE THAT THE RIGHT TO TRIAL BY JURY IS A CONSTITUTIONAL ONE, BUT THAT IT MAY BE WAIVED. EACH OF THEM, AFTER CONSULTING OR HAVING HAD THE OPPORTUNITY TO CONSULT, WITH COUNSEL OF THEIR CHOICE, KNOWINGLY, VOLUNTARILY AND INTENTIONALLY WAIVES ANY RIGHT ANY OF THEM MAY HAVE TO A TRIAL BY JURY IN ANY LITIGATION BASED UPON OR ARISING OUT OF THIS AGREEMENT OR ANY RELATED INSTRUMENT OR LOAN DOCUMENT OR ANY OF THE TRANSACTIONS CONTEMPLATED BY THIS AGREEMENT OR ANY COURSE OF CONDUCT, DEALING, STATEMENTS (WHETHER ORAL OR WRITTEN), OR ACTION OF ANY OF THEM. THESE PROVISIONS SHALL NOT BE DEEMED TO HAVE BEEN MODIFIED IN ANY RESPECT OR RELINQUISHED BY BANK OR BORROWER, EXCEPT BY A WRITTEN INSTRUMENT EXECUTED BY EACH OF THEM. If the jury waiver set forth in this Section 11 is not enforceable, then any dispute, controversy, claim, action or similar proceeding arising out of or relating to this Agreement, the Loan Documents or any of the transactions contemplated therein shall be settled by final and binding arbitration held in Durham County, North Carolina in accordance with the then current Commercial Arbitration Rules of the American Arbitration Association by one arbitrator appointed in accordance with those rules. The arbitrator shall apply North Carolina law to the resolution of any dispute, without reference to rules of conflicts of law or rules of statutory arbitration. Judgment upon any award resulting from arbitration may be entered into and enforced by any state or federal court having jurisdiction thereof. Notwithstanding the foregoing, the parties may apply to any court of competent jurisdiction for preliminary or interim equitable relief, or to compel arbitration in accordance with this Section. The costs and expenses of the arbitration, including without limitation, the

arbitrator's fees and expert witness fees, and reasonable attorneys' fees, incurred by the parties to the arbitration may be awarded to the prevailing party, in the discretion of the arbitrator, or may be apportioned between the parties in any manner deemed appropriate by the arbitrator. Unless and until the arbitrator decides that one party is to pay for all (or a share) of such costs and expenses, both parties shall share equally in the payment of the arbitrator's fees as and when billed by the arbitrator.

12. GENERAL PROVISIONS.

12.1 Successors and Assigns. This Agreement shall bind and inure to the benefit of the respective successors and permitted assigns of each of the parties and shall bind all persons who become bound as a debtor to this Agreement; provided, however, that neither this Agreement nor any rights hereunder may be assigned by Borrower without Bank's prior written consent, which consent may be granted or withheld in Bank's sole discretion. Bank shall have the right without the consent of or notice to Borrower to sell, assign, transfer, negotiate, or grant participation in all or any part of, or any interest in, Bank's obligations, rights and benefits hereunder. Notwithstanding the preceding sentence, an assignment or transfer by Bank of its obligations, rights, and benefits hereunder shall require the consent of Borrower (not to be unreasonably withheld, delayed, or conditioned) if (a) no Event of Default has occurred at any time during the term of this Agreement, and (b) such assignment or transfer is not in connection with a merger or acquisition of the stock or assets of Bank generally or to an Affiliate of Bank.

12.2 Indemnification. Borrower shall defend, indemnify and hold harmless Bank and its officers, directors, employees, affiliates, advisors and agents against: (a) all obligations, demands, claims, and liabilities claimed or asserted by any other party in connection with the transactions contemplated by this Agreement; and (b) all losses or Bank Expenses in any way suffered, incurred, or paid by Bank, its officers, employees and agents as a result of or in any way arising out of, following, or consequential to transactions between Bank and Borrower whether under this Agreement, or otherwise (including without limitation reasonable attorneys' fees and expenses), except for losses caused by Bank's gross negligence or willful misconduct as determined by a court of competent jurisdiction by final and non-appealable order.

12.3 Time of Essence. Time is of the essence for the performance of all obligations set forth in this Agreement.

12.4 Severability of Provisions. Each provision of this Agreement shall be severable from every other provision of this Agreement for the purpose of determining the legal enforceability of any specific provision.

12.5 Amendments in Writing, Integration. All amendments to or terminations of this Agreement or the other Loan Documents must be in writing. All prior agreements, understandings, representations, warranties, and negotiations between the parties hereto with respect to the subject matter of this Agreement and the other Loan Documents, if any, are merged into this Agreement and the Loan Documents.

12.6 Counterparts. This Agreement may be executed in any number of counterparts and by different parties on separate counterparts, each of which, when executed and

delivered, shall be deemed to be an original, and all of which, when taken together, shall constitute but one and the same Agreement. Executed copies of the signature pages of this Agreement sent by facsimile or transmitted electronically in Portable Document Format ("PDF"), or any similar format, shall be treated as originals, fully binding and with full legal force and effect, and the parties waive any rights they may have to object to such treatment.

12.7 Survival. All covenants, representations and warranties made in this Agreement shall continue in full force and effect so long as any Obligations remain outstanding or Bank has any obligation to make any Credit Extension to Borrower. The obligations of Borrower to indemnify Bank with respect to the expenses, damages, losses, costs and liabilities described in Section 12.2 shall survive until all applicable statute of limitations periods with respect to actions that may be brought against Bank have run.

12.8 Confidentiality and Publicity.

(a) Borrower shall not, and shall not permit any of its Affiliates to: (i) publish or disclose any materials containing Bank's name, including in any press release or otherwise in connection with any advertising or marketing, without first obtaining Bank's prior written consent, or (ii) use Bank's name (or the name of any of its Affiliates) in connection with its operations or business. Notwithstanding the foregoing, Bank acknowledges that Borrower may disclose and make available to the public materials containing Bank's name or other information to the extent required by the Securities and Exchange Commission or in connection with Borrower's submission of reports or information to the Securities and Exchange Commission.

(b) In handling any confidential information, Bank shall exercise commercially reasonable efforts to maintain in confidence, in accordance with its customary procedures for handling confidential information, all written non-public information furnished to Bank on a confidential basis clearly identified at the time of delivery as such ("Confidential Information") other than any such Confidential Information that becomes generally available to the public or becomes available to Bank from a source other than Borrower and that is not known to Bank to be subject to confidentiality obligations; provided, that Bank and its Affiliates shall have the right to disclose Confidential Information to: (i) such Person's Affiliates; (ii) such Person or such Person's Affiliates' lenders, funding sources, or financing sources; (iii) such Person's or such Person's Affiliates' directors, officers, trustees, partners, members, managers, employees, agents, advisors, representatives, attorneys, equity owners, professional consultants, portfolio management services and rating agencies; (iv) any successor or assign of Bank; (v) any Person to whom Bank offers to sell, assign or transfer any Credit Extension or any part thereof or any interest or participation therein; (vi) any Person that provides statistical analysis and/or information services to Bank or its Affiliates; and (vii) any Person (A) to the extent required by it by law, (B) as may be required in connection with the examination, audit, or similar investigation of Bank, (C) in response to any subpoena or other legal process or informal investigative demand, (D) in connection with any litigation, or (E) in connection with the actual or potential exercise or enforcement of any right or remedy under any Loan Document. The obligations of Bank and its Affiliates under this Section 12.8 shall supersede and replace any other confidentiality obligations agreed to by Bank or its Affiliates.

13. CO-BORROWER PROVISIONS.

13.1 Primary Obligation. This Agreement is a primary and original obligation of each Borrower and shall remain in effect notwithstanding future changes in conditions, including any change of law or any invalidity or irregularity in the creation or acquisition of any Obligations or in the execution or delivery of any agreement between Bank and any Borrower. Each Borrower shall be liable for existing and future Obligations as fully as if all of all Credit Extensions were advanced to such Borrower. Bank may rely on any certificate or representation made by any Borrower as made on behalf of, and binding on, all Borrowers, including without limitation Disbursement Request Forms and Compliance Certificates.

13.2 Enforcement of Rights. Borrowers are jointly and severally liable for the Obligations and Bank may proceed against one or more of the Borrowers to enforce the Obligations without waiving its right to proceed against any of the other Borrowers.

13.3 Borrowers as Agents. Each Borrower appoints the other Borrower as its agent with all necessary power and authority to give and receive notices, certificates or demands for and on behalf of both Borrowers, to act as disbursing agent for receipt of any Credit Extensions on behalf of each Borrower and to apply to Bank on behalf of each Borrower for Credit Extensions, any waivers and any consents. This authorization cannot be revoked, and Bank need not inquire as to each Borrower's authority to act for or on behalf of Borrower.

13.4 Subrogation and Similar Rights. Notwithstanding any other provision of this Agreement or any other Loan Document, each Borrower irrevocably waives all rights that it may have at law or in equity (including, without limitation, any law subrogating Borrower to the rights of Bank under the Loan Documents) to seek contribution, indemnification, or any other form of reimbursement from any other Borrower, or any other Person now or hereafter primarily or secondarily liable for any of the Obligations, for any payment made by Borrower with respect to the Obligations in connection with the Loan Documents or otherwise and all rights that it might have to benefit from, or to participate in, any security for the Obligations as a result of any payment made by Borrower with respect to the Obligations in connection with the Loan Documents or otherwise. Any agreement providing for indemnification, reimbursement or any other arrangement prohibited under this Section 13.4 shall be null and void. If any payment is made to a Borrower in contravention of this Section 13.4, such Borrower shall hold such payment in trust for Bank and such payment shall be promptly delivered to Bank for application to the Obligations, whether matured or unmatured.

13.5 Waivers of Notice. Except as otherwise provided in this Agreement, each Borrower waives notice of acceptance hereof; notice of the existence, creation or acquisition of any of the Obligations; notice of an Event of Default; notice of the amount of the Obligations outstanding at any time; notice of intent to accelerate; notice of acceleration; notice of any adverse change in the financial condition of any other Borrower or of any other fact that might increase Borrower's risk; presentment for payment; demand; protest and notice thereof as to any instrument; default; and all other notices and demands to which Borrower would otherwise be entitled. Each Borrower waives any defense arising from any defense of any other Borrower, or by reason of the cessation from any cause whatsoever of the liability of any other Borrower. Bank's failure at any time to require strict performance by any Borrower of any provision of the

Loan Documents shall not waive, alter or diminish any right of Bank thereafter to demand strict compliance and performance therewith. Nothing contained herein shall prevent Bank from foreclosing on the Lien of any deed of trust, mortgage or other security instrument, or exercising any rights available thereunder, and the exercise of any such rights shall not constitute a legal or equitable discharge of any Borrower. Each Borrower also waives any defense arising from any act or omission of Bank that changes the scope of Borrower's risks hereunder.

13.6 Subrogation Defenses. Each Borrower hereby waives any defense based on impairment or destruction of its subrogation or other rights against any other Borrower and waives all benefits which might otherwise be available to it under any statutory or common law suretyship defenses or marshalling rights, now or hereafter in effect.

13.7 Right to Settle, Release.

(a) The liability of Borrowers hereunder shall not be diminished by (i) any agreement, understanding or representation that any of the Obligations is or was to be guaranteed by another Person or secured by other property, or (ii) any release or unenforceability, whether partial or total, of rights, if any, which Bank may now or hereafter have against any other Person, including another Borrower, or property with respect to any of the Obligations.

(b) Without affecting the liability of any Borrower hereunder, Bank may (i) compromise, settle, renew, extend the time for payment, change the manner or terms of payment, discharge the performance of, decline to enforce, or release all or any of the Obligations with respect to a Borrower, (ii) grant other indulgences to a Borrower in respect of the Obligations, (iii) modify in any manner any documents relating to the Obligations with respect to a Borrower, (iv) release, surrender or exchange any deposits or other property securing the Obligations, whether pledged by a Borrower or any other Person, or (v) compromise, settle, renew, or extend the time for payment, discharge the performance of, decline to enforce, or release all or any obligations of any guarantor, endorser or other Person who is now or may hereafter be liable with respect to any of the Obligations.

13.8 Subordination. All indebtedness of a Borrower now or hereafter arising held by another Borrower is subordinated to the Obligations and the Borrower holding the indebtedness shall take all actions reasonably requested by Bank to effect, to enforce and to give notice of such subordination.

IN WITNESS WHEREOF, the parties hereto have caused this Agreement to be executed as of the date first above written.

PRECISION BIOSCIENCES, INC.

By: /s/ Abid Ansari

Name: Abid Ansari

Title: Chief Financial Officer

ELO LIFE SYSTEMS, INC.

By: /s/ Fayaz Khazi

Name: Fayaz Khazi

Title: Chief Executive Officer

PACIFIC WESTERN BANK

By: /s/ Zack Robbins

Name: Zack Robbins

Title: VP

EXHIBIT A

DEFINITIONS

"Accounts" means all presently existing and hereafter arising accounts, contract rights, payment intangibles and all other forms of obligations owing to Borrower arising out of the sale or lease of goods (including, without limitation, the licensing of software and other technology) or the rendering of services by Borrower and any and all credit insurance, guaranties, and other security therefor, as well as all merchandise returned to or reclaimed by Borrower and Borrower's Books relating to any of the foregoing.

"Advance" or "Advances" means a cash advance or cash advances under the Revolving Line.

"Affiliate" means, with respect to any Person, any Person that owns or controls directly or indirectly such Person, any Person that controls or is controlled by or is under common control with such Person, and each of such Person's senior executive officers, directors, and general partners.

"Authorized Officer" means someone designated as such in the corporate resolution provided by Borrower to Bank in which this Agreement and the transactions contemplated hereunder are authorized by Borrower's board of directors. If Borrower provides subsequent corporate resolutions to Bank after the Closing Date, the individual(s) designated as "Authorized Officer(s)" in the most recently provided resolution shall be the only "Authorized Officers" for purposes of this Agreement.

"Bank Expenses" means all reasonable costs or expenses (including reasonable attorneys' fees and expenses, whether generated by in-house or by outside counsel) incurred in connection with the preparation, negotiation, administration, and enforcement of the Loan Documents; reasonable Collateral audit fees; and Bank's reasonable attorneys' fees and expenses (whether generated in-house or by outside counsel) incurred in amending, enforcing or defending the Loan Documents (including fees and expenses of appeal), incurred before, during and after an Insolvency Proceeding, whether or not suit is brought.

"Borrower's Books" means all of Borrower's books and records, including: ledgers; records concerning Borrower's assets or liabilities, the Collateral, business operations or financial condition; and all computer programs, or tape files, and the equipment, containing such information.

"Business Day" means any day that is not a Saturday, Sunday, or other day on which banks in the State of North Carolina are authorized or required to close.

"Capitalized Expenditures" means current period unfinanced cash expenditures that are capitalized and amortized over a period of time in accordance with GAAP, including but not limited to capitalized cash expenditures for capital equipment, capitalized manufacturing and labor costs as they relate to inventory, and capitalized cash expenditures for software development.

"Cash" means unrestricted cash and cash equivalents.

“Change in Control” shall mean (a) a transaction other than a bona fide equity financing or series of financings on terms and from investors reasonably acceptable to Bank in which any “person” or “group” (within the meaning of Section 13(d) and 14(d)(2) of the Securities Exchange Act of 1934) becomes the “beneficial owner” (as defined in Rule 13d-3 under the Securities Exchange Act of 1934), directly or indirectly, of a sufficient number of shares of all classes of stock then outstanding of Parent ordinarily entitled to vote in the election of directors, empowering such “person” or “group” to elect a majority of the Board of Directors of Parent, who did not have such power before such transaction; or (b) Borrower shall cease to own and control 100% of the equity interests in each of its Subsidiaries.

“Closing Date” means the date of this Agreement.

“Code” means the North Carolina Uniform Commercial Code as amended or supplemented from time to time.

“Collateral” means the property described on Exhibit B attached hereto and all Negotiable Collateral to the extent not described on Exhibit B, except to the extent any such property (i) is non-assignable by its terms without the consent of the licensor thereof or another party (but only to the extent such prohibition on transfer is enforceable under applicable law, including, without limitation, Sections §25-9-406 and §25-9-408 of the Code), (ii) is property for which the granting of a security interest therein is contrary to applicable law, provided that upon the cessation of any such restriction or prohibition, such property shall automatically become part of the Collateral, (iii) constitutes the capital stock of a controlled foreign corporation (as defined in the IRC), in excess of 65% of the voting power of all classes of capital stock of such controlled foreign corporations entitled to vote, (iv) property (including any attachments, accessions or replacements) that is subject to a Lien that is permitted pursuant to clause (c) of the definition of Permitted Liens, if the grant of a security interest with respect to such property pursuant to this Agreement would be prohibited by the agreement creating such Permitted Lien or would otherwise constitute a default thereunder, provided, that such property will be deemed "Collateral" hereunder upon the termination and release of such Permitted Lien, or (v) is an Excluded Account.

“Collateral State” means the state or states where the Collateral is located, which is North Carolina.

“Compliance Certificate” means a compliance certificate, in substantially the form of Exhibit D attached hereto, executed by a Responsible Officer of Borrower.

“Contingent Obligation” means, as applied to any Person, any direct or indirect liability, contingent or otherwise, of that Person with respect to (i) any indebtedness, lease, dividend, letter of credit or other obligation of another, including, without limitation, any such obligation directly or indirectly guaranteed, endorsed, co-made or discounted or sold with recourse by that Person, or in respect of which that Person is otherwise directly or indirectly liable; (ii) any obligations with respect to undrawn letters of credit, corporate credit cards or merchant services issued for the account of that Person; and (iii) all obligations arising under any interest rate, currency or commodity swap agreement, interest rate cap agreement, interest rate collar agreement, or other agreement or arrangement designated to protect a Person against fluctuation in interest rates, currency exchange rates or commodity prices; provided, however, that the term “Contingent Obligation” shall not include endorsements for collection or deposit in the ordinary course of

business. The amount of any Contingent Obligation shall be deemed to be an amount equal to the stated or determined amount of the primary obligation in respect of which such Contingent Obligation is made or, if not stated or determinable, the maximum reasonably anticipated liability in respect thereof as determined by such Person in good faith; provided, however, that such amount shall not in any event exceed the maximum amount of the obligations under the guarantee or other support arrangement.

"Copyrights" means any and all copyright rights, copyright applications, copyright registrations and like protections in each work or authorship and derivative work thereof, whether published or unpublished and whether or not the same also constitutes a trade secret, now or hereafter existing, created, acquired or held.

"Credit Card Line" means a Credit Extension of up to $75,000, to be used exclusively for the provision of Credit Card Services.

"Credit Card Maturity Date" means the date that is 364 days after the Closing Date.

"Credit Extension" means each Advance, the Credit Card Services provided under the Credit Card Line, or any other extension of credit by Bank to or for the benefit of Borrower hereunder.

"Deposit Account Threshold" means One Hundred Million Dollars ($100,000,000), provided that the calculation of Borrower's Cash held at Bank and Bank's affiliates shall exclude any amounts held in Excluded Accounts for purposes of calculating whether Borrower meets the Deposit Account Threshold as of any date of determination.

"Early Termination Fee" is defined in Section 2.5(c).

"Equipment" means all present and future machinery, equipment, tenant improvements, furniture, fixtures, vehicles, tools, parts and attachments in which Borrower has any interest.

"ERISA" means the Employee Retirement Income Security Act of 1974, as amended, and the regulations thereunder.

"Event of Default" has the meaning assigned in Article 8.

"Excluded Accounts" means deposit accounts exclusively used for payroll, payroll taxes, and other employee wage and benefit payments to or for the benefit of Borrower's employees and identified to Bank by Borrower as such; provided that the amount of funds in such accounts does not at any time exceeds in the aggregate: the sum of (x) two (2) weeks of Borrower's then-current payroll expenses, plus (y) the amount held in trust for Borrower's employees directly from employee wage and benefit payments.

"Extension Milestone" means Borrower has delivered evidence acceptable to Bank that Borrower has received, during the twelve-month period beginning on March 1, 2019, aggregate gross Cash proceeds of not less than $175,000,000 from the issuance of Borrower's equity securities on term and conditions, and from investors, satisfactory to Bank. Bank acknowledges that the Extension Milestone has been achieved on or prior to the Closing Date.

"GAAP" means generally accepted accounting principles, consistently applied, as in effect from time to time in the United States.

"Indebtedness" means (a) all indebtedness for borrowed money or the deferred purchase price of property or services, including without limitation reimbursement and other obligations with respect to surety bonds and letters of credit, (b) all obligations evidenced by notes, bonds, debentures or similar instruments, (c) all capital lease obligations, and (d) all Contingent Obligations, including but not limited to any sublimit contained herein.

"Insolvency Proceeding" means any proceeding commenced by or against any Person or entity under any provision of the United States Bankruptcy Code, as amended, or under any other bankruptcy or insolvency law, including assignments for the benefit of creditors, formal or informal moratoria, compositions, extension generally with its creditors, or proceedings seeking reorganization, arrangement, or other relief.

"Intellectual Property" means all of Borrower's right, title, and interest in and to the following:

(a) Copyrights, Trademarks and Patents;

(b) Any and all trade secrets, and any and all intellectual property rights in computer software and computer software products now or hereafter existing, created, acquired or held;

(c) Any and all design rights which may be available to Borrower now or hereafter existing, created, acquired or held;

(d) Any and all claims for damages by way of past, present and future infringement of any of the rights included above, with the right, but not the obligation, to sue for and collect such damages for said use or infringement of the intellectual property rights identified above;

(e) All licenses or other rights to use any of the Copyrights, Patents or Trademarks, and all license fees and royalties arising from such use to the extent permitted by such license or rights;

(f) All amendments, renewals and extensions of any of the Copyrights, Trademarks or Patents; and

(g) All proceeds and products of the foregoing, including without limitation all payments under insurance or any indemnity or warranty payable in respect of any of the foregoing.

"Inventory" means all present and future inventory in which Borrower has any interest.

"Investment" means any beneficial ownership of (including stock, partnership or limited liability company interest or other securities) any Person, or any loan, advance or capital contribution to any Person.

"IRC" means the Internal Revenue Code of 1986, as amended, and the regulations thereunder.

"Letter of Credit" means a commercial or standby letter of credit or similar undertaking issued by Bank (or any of its correspondent banks) at Borrower's request.

“Lien” means any mortgage, lien, deed of trust, charge, pledge, security interest or other encumbrance.

“Loan Documents” means, collectively, this Agreement, any note or notes executed by Borrower, and any other document, instrument or agreement entered into in connection with this Agreement, all as amended or extended from time to time.

“Material Adverse Effect” means a material adverse effect on (i) the operations, business or financial condition of Borrower and its Subsidiaries taken as a whole, (ii) the ability of Borrower to repay the Obligations or otherwise perform its obligations under the Loan Documents, or (iii) Borrower’s interest in, or the value, perfection or priority of Bank’s security interest in the Collateral.

“Negotiable Collateral” means all of Borrower’s present and future letters of credit of which it is a beneficiary, drafts, instruments (including promissory notes), securities, documents of title, and chattel paper, and Borrower’s Books relating to any of the foregoing.

“Obligations” means all debt, principal, interest, Bank Expenses, obligations in respect of Credit Card Services, and other amounts owed to Bank by Borrower pursuant to this Agreement or any other agreement, whether absolute or contingent, due or to become due, now existing or hereafter arising, including any interest that accrues after the commencement of an Insolvency Proceeding and including any debt, liability, or obligation owing from Borrower to others that Bank may have obtained by assignment or otherwise.

“Patents” means all patents, patent applications and like protections including without limitation improvements, divisions, continuations, renewals, reissues, extensions and continuations-in-part of the same.

“Periodic Payments” means all installments or similar recurring payments that Borrower may now or hereafter become obligated to pay to Bank pursuant to the terms and provisions of any instrument, or agreement now or hereafter in existence between Borrower and Bank.

“Permitted Indebtedness” means:

(a) Indebtedness of Borrower in favor of Bank arising under this Agreement or any other Loan Document;

(b) Indebtedness existing on the Closing Date and disclosed in the Schedule;

(c) Indebtedness not to exceed $500,000 in the aggregate at any time secured by a lien described in clause (c) of the defined term “Permitted Liens,” provided such Indebtedness does not exceed at the time it is incurred the lesser of the cost or fair market value of the property financed with such Indebtedness;

(d) Subordinated Debt;

(e) Indebtedness from one Borrower to any other Borrower;

(f) Indebtedness to trade creditors incurred in the ordinary course of business; and

(g) Extensions, refinancings and renewals of any items of Permitted Indebtedness, provided that the principal amount is not increased or the terms modified to impose more burdensome terms upon Borrower or its Subsidiary, as the case may be.

"Permitted Investment" means:

(a) Investments existing on the Closing Date disclosed in the Schedule;

(b) (i) Marketable direct obligations issued or unconditionally guaranteed by the United States of America or any agency or any State thereof maturing within one year from the date of acquisition thereof, (ii) commercial paper maturing no more than one year from the date of creation thereof and currently having rating of at least A-2 or P-2 from either Standard & Poor's Corporation or Moody's Investors Service, (iii) Bank's certificates of deposit maturing no more than one year from the date of investment therein, and (iv) Bank's money market accounts; (v) Investments in regular deposit or checking accounts held with Bank or as otherwise permitted by, and subject to the terms and conditions of, Section 6.6 of this Agreement; and (vi) Investments consistent with any investment policy adopted by Borrower's board of directors;

(c) Investments accepted in connection with Permitted Transfers;

(d) Investments of Subsidiaries in or to other Subsidiaries or Borrower and Investments by Borrower in Subsidiaries not to exceed $500,000 in the aggregate in any fiscal year;

(e) Investments not to exceed $500,000 outstanding in the aggregate at any time consisting of (i) travel advances and employee relocation loans and other employee loans and advances in the ordinary course of business, and (ii) loans to employees, officers or directors relating to the purchase of equity securities of Borrower or its Subsidiaries pursuant to employee stock purchase plan agreements approved by Borrower's Board of Directors;

(f) Investments (including debt obligations) received in connection with the bankruptcy or reorganization of customers or suppliers and in settlement of delinquent obligations of, and other disputes with, customers or suppliers arising in the ordinary course of Borrower's business;

(g) Investments consisting of notes receivable of, or prepaid royalties and other credit extensions, to customers and suppliers who are not Affiliates, in the ordinary course of business, provided that this subparagraph (g) shall not apply to Investments of Borrower in any Subsidiary;

(h) Joint ventures or strategic alliances in the ordinary course of Borrower's business consisting of the non-exclusive licensing of technology, the development of technology or the providing of technical support, provided that any cash Investments by Borrower do not exceed $500,000 in the aggregate in any fiscal year; and

(i) Investments permitted under Section 7.3.

"Permitted Liens" means the following:

(a) Any Liens existing on the Closing Date and disclosed in the Schedule (excluding Liens to be satisfied with the proceeds of the Credit Extensions) or arising under this Agreement, the other Loan Documents, or any other agreement in favor of Bank;

(b) Liens for taxes, fees, assessments or other governmental charges or levies, either not delinquent or being contested in good faith by appropriate proceedings and for which Borrower maintains adequate reserves;

(c) Liens not to exceed $500,000 in the aggregate at any time (i) upon or in any Equipment (other than Equipment financed by a Credit Extension) acquired or held by Borrower or any of its Subsidiaries to secure the purchase price of such Equipment or indebtedness incurred solely for the purpose of financing the acquisition or lease of such Equipment, or (ii) existing on such Equipment at the time of its acquisition, in each case provided that the Lien is confined solely to the property so acquired and improvements thereon, and the proceeds of such Equipment;

(d) Liens incurred in connection with the extension, renewal or refinancing of the indebtedness secured by Liens of the type described in clauses (a) through (c) above, provided that any extension, renewal or replacement Lien shall be limited to the property encumbered by the existing Lien and the principal amount of the indebtedness being extended, renewed or refinanced does not increase; and

(e) Liens arising from judgments, decrees or attachments in circumstances not constituting an Event of Default under Sections 8.4 (attachment) or8.8 (judgments).

“Permitted Transfer” means the conveyance, sale, lease, transfer or disposition by Borrower or any Subsidiary of:

(a) Inventory in the ordinary course of business;

(b) licenses and similar arrangements for the use of the property of Borrower or its Subsidiaries in the ordinary course of business;

(c) worn-out, surplus or obsolete Equipment not financed with the proceeds of Credit Extensions;

(d) grants of security interests and other Liens that constitute Permitted Liens; and

(e) other assets of Borrower or its Subsidiaries that do not in the aggregate exceed $250,000 during any fiscal year.

“Person” means any individual, sole proprietorship, partnership, limited liability company, joint venture, trust, unincorporated organization, association, corporation, institution, public benefit corporation, firm, joint stock company, estate, entity or governmental agency.

“Prime Rate” means the variable rate of interest, per annum, most recently announced by Bank, as its “prime rate,” whether or not such announced rate is the lowest rate available from Bank.

“Responsible Officer” means each of the Chief Executive Officer, the Chief Operating Officer, the Chief Financial Officer, Vice President of Finance and the Controller of Borrower, as well as any other officer or employee identified as an Authorized Officer in the corporate resolution delivered by Borrower to Bank in connection with this Agreement.

“Revolving Line” means a Credit Extension of up to $50,000,000.

“Revolving Maturity Date” means May 15, 2020; provided, however, that if Borrower achieves the “Extension Milestone”, then “Revolving Maturity Date” shall instead mean May 15, 2022.

“Schedule” means the schedule of exceptions attached hereto and approved by Bank, if any.

“Shares” means (i) sixty-five percent (65%) of the issued and outstanding capital stock, membership units or other securities owned or held of record by Borrower in any Subsidiary of Borrower which is not an entity organized under the laws of the United States or territory thereof, and (ii) one hundred percent (100%) of the issued and outstanding capital stock, membership units or other securities owned or held of record by Borrower in any Subsidiary of Borrower which is an entity organized under the laws of the United States or any territory thereof.

“SOS Reports” means the official reports from the Secretaries of State of each Collateral State, the state where Borrower’s chief executive office is located, the state of Borrower’s formation and other applicable federal, state or local government offices identifying all current security interests filed in the Collateral and Liens of record as of the date of such report.

“Subordinated Debt” means any debt incurred by Borrower that is subordinated in writing to the debt owing by Borrower to Bank on terms reasonably acceptable to Bank (and identified as being such by Borrower and Bank).

“Subsidiary” means any corporation, partnership or limited liability company or joint venture in which (i) any general partnership interest or (ii) more than 50% of the stock, limited liability company interest or joint venture of which by the terms thereof ordinary voting power to elect the Board of Directors, managers or trustees of the entity, at the time as of which any determination is being made, is owned by Borrower, either directly or through an Affiliate.

“Trademarks” means any trademark and servicemark rights, whether registered or not, applications to register and registrations of the same and like protections, and the entire goodwill of the business of Borrower connected with and symbolized by such trademarks.

DEBTOR **PRECISION BIOSCIENCES, INC.**

SECURED PARTY: **PACIFIC WESTERN BANK**

EXHIBIT B

COLLATERAL DESCRIPTION ATTACHMENT TO LOAN AND SECURITY AGREEMENT

All personal property of Borrower (herein referred to as "Borrower" or "Debtor") whether presently existing or hereafter created or acquired, and wherever located, including, but not limited to:

(a) all accounts (including health-care-insurance receivables), chattel paper (including tangible and electronic chattel paper), deposit accounts, documents (including negotiable documents), equipment (including all accessions and additions thereto), financial assets, general intangibles (including patents, trademarks, copyrights, goodwill, payment intangibles, domain names and software), goods (including fixtures), instruments (including promissory notes), inventory (including all goods held for sale or lease or to be furnished under a contract of service, and including returns and repossessions), investment property (including securities and securities entitlements), letter of credit rights, money, and all of Debtor's books and records with respect to any of the foregoing, and the computers and equipment containing said books and records;

(b) any and all cash proceeds and/or noncash proceeds of any of the foregoing, including, without limitation, insurance proceeds, and all supporting obligations and the security therefor or for any right to payment. All terms above have the meanings given to them in the North Carolina Uniform Commercial Code, as amended or supplemented from time to time, including revised Division 9 of the Uniform Commercial Code-Secured Transactions.

Notwithstanding the foregoing, the Collateral shall not include any of the intellectual property, in any medium, of any kind or nature whatsoever, now or hereafter owned or acquired or received by Borrower, or in which Borrower now holds or hereafter acquires or receives any right or interest (collectively, the "Intellectual Property"); provided, however, that the Collateral shall include all accounts and general intangibles that consist of rights to payment and proceeds from the sale, licensing or disposition of all or any part, or rights in, the foregoing (the "Rights to Payment").

Notwithstanding the foregoing, if a judicial authority (including a U.S. Bankruptcy Court) holds that a security interest in the underlying Intellectual Property is necessary to have a security interest in the Rights to Payment, then the Collateral shall automatically, and effective as of May 15, 2019, include the Intellectual Property to the extent and only to the extent necessary to permit perfection of Bank's security interest in the Rights to Payment, and further provided, however, that Bank's enforcement rights with respect to any security interest in the Intellectual Property shall be absolutely limited to the Rights to Payment only, and Bank shall have no recourse whatsoever with respect to the underlying Intellectual Property.

DEBTOR **ELO LIFE SYSTEMS, INC.**

SECURED PARTY: **PACIFIC WESTERN BANK**

EXHIBIT B-1

COLLATERAL DESCRIPTION ATTACHMENT TO LOAN AND SECURITY AGREEMENT

All personal property of Borrower (herein referred to as "Borrower" or "Debtor") whether presently existing or hereafter created or acquired, and wherever located, including, but not limited to:

(a) all accounts (including health-care-insurance receivables), chattel paper (including tangible and electronic chattel paper), deposit accounts, documents (including negotiable documents), equipment (including all accessions and additions thereto), financial assets, general intangibles (including patents, trademarks, copyrights, goodwill, payment intangibles, domain names and software), goods (including fixtures), instruments (including promissory notes), inventory (including all goods held for sale or lease or to be furnished under a contract of service, and including returns and repossessions), investment property (including securities and securities entitlements), letter of credit rights, money, and all of Debtor's books and records with respect to any of the foregoing, and the computers and equipment containing said books and records;

(b) any and all cash proceeds and/or noncash proceeds of any of the foregoing, including, without limitation, insurance proceeds, and all supporting obligations and the security therefor or for any right to payment. All terms above have the meanings given to them in the North Carolina Uniform Commercial Code, as amended or supplemented from time to time, including revised Division 9 of the Uniform Commercial Code-Secured Transactions.

Notwithstanding the foregoing, the Collateral shall not include any of the intellectual property, in any medium, of any kind or nature whatsoever, now or hereafter owned or acquired or received by Borrower, or in which Borrower now holds or hereafter acquires or receives any right or interest (collectively, the "Intellectual Property"); provided, however, that the Collateral shall include all accounts and general intangibles that consist of rights to payment and proceeds from the sale, licensing or disposition of all or any part, or rights in, the foregoing (the "Rights to Payment").

Notwithstanding the foregoing, if a judicial authority (including a U.S. Bankruptcy Court) holds that a security interest in the underlying Intellectual Property is necessary to have a security interest in the Rights to Payment, then the Collateral shall automatically, and effective as of May 15, 2019, include the Intellectual Property to the extent and only to the extent necessary to permit perfection of Bank's security interest in the Rights to Payment, and further provided, however, that Bank's enforcement rights with respect to any security interest in the Intellectual Property shall be absolutely limited to the Rights to Payment only, and Bank shall have no recourse whatsoever with respect to the underlying Intellectual Property.

EXHIBIT C

LOAN ADVANCE/PAYDOWN REQUEST FORM
[Please refer to New Borrower Kit]

EXHIBIT D

COMPLIANCE CERTIFICATE

[Please refer to New Borrower Kit]

SCHEDULE OF EXCEPTIONS

(omitted pursuant to SEC regulations)

Permitted Indebtedness (Exhibit A)
Permitted Investments (Exhibit A)
Prior Names (Section 5.5)
Litigation (Section 5.6)
Inbound Licenses (Section 5.12)

FIRST AMENDMENT
TO
LOAN AND SECURITY AGREEMENT

This First Amendment to Loan and Security Agreement (this "***Amendment***") is made and entered into as of September 18, 2019, by and among PACIFIC WESTERN BANK, a California state chartered bank ("***Bank***"), and PRECISION BIOSCIENCES, INC. and ELO LIFE SYSTEMS, INC. (individually and collectively, jointly and severally, "***Borrower***").

RECITALS

Borrower and Bank are parties to that certain Loan and Security Agreement dated as of May 15, 2019 (as amended from time to time, the "***Agreement***"). The parties desire to amend the Agreement in accordance with the terms of this Amendment.

NOW, THEREFORE, the parties agree as follows:

1) Section 6.6 of the Agreement is hereby amended and restated, as follows:

6.6 Primary Depository. At all times when the aggregate balance of Borrower's Cash at Bank and Bank's affiliates is less than the Deposit Account Threshold, Borrower shall maintain, and shall cause all of its Subsidiaries to maintain, all depository and operating accounts with Bank and all investment accounts with Bank or Bank's affiliates. At all times when the aggregate balance of Borrower's Cash at Bank and Bank's affiliates equals or exceeds the Deposit Account Threshold, Borrower and its Subsidiaries may maintain Cash balances that exceed the Deposit Account Threshold in depository, operating, and investments accounts outside of Bank or Bank's affiliates, so long as each such account outside of Bank is subject to a dulyexecuted account control agreement in favor of Bank, and in form and substance reasonably satisfactory to Bank. Notwithstanding the foregoing, Precision UK may maintain a bank account in the United Kingdom, with such account not subject to an account control agreement in favor of Bank, so long as the balance in such account does not exceed $150,000 (or its USD equivalent) at any time. Prior to Borrower maintaining any investment accounts with Bank's affiliates, Borrower, Bank, and any such affiliate shall have entered into a securities account control agreement with respect to any such investment accounts, in form and substance reasonably satisfactory to Bank.

2) A new Section 7.13 is hereby added to the Agreement, as follows:

7.13 UK Subsidiary. Permit Precision UK to maintain cash exceeding $150,000 or non- cash assets exceeding a book value of $50,000 at any time.

3) Bank's notice addresses in Article 10 of the Agreement are hereby amended and restated, as follows:

If to Bank: Pacific Western Bank
406 Blackwell Street, Suite 240
Durham, North Carolina 27701
Attn: Loan Operations Manager

FAX: (919) 314-3080
Email: loannotices@pacwest.com

with a Copy to: Pacific Western Bank
131 Oliver Street, Suite 250
Boston, Massachusetts 02110 Attn: Scott Hansen
Email: shansen@pacwest.com

4) Subsection (d) of the defined term "Permitted Investment" in Exhibit A to the Agreement is hereby amended and restated, as follows:

(d) Investments of Subsidiaries in or to other Subsidiaries or Borrower and Investments by Borrower in Subsidiaries not to exceed $1,000,000 in the aggregate in any fiscal year;

5) The following defined term is hereby added to Exhibit A of the Agreement, as follows: "Precision UK" means Precision Biosciences UK Limited, a private limited company formed under the laws of England and Wales and a wholly owned Subsidiary of Borrower.

6) Unless otherwise defined, all initially capitalized terms in this Amendment shall be as defined in the Agreement. The Agreement, as amended hereby, shall be and remain in full force and effect in accordance with its respective terms and hereby is ratified and confirmed in all respects. Except as expressly set forth herein, the execution, delivery, and performance of this Amendment shall not operate as a waiver of, or as an amendment of, any right, power, or remedy of Bank under the Agreement, as in effect prior to the date hereof. Each Borrower ratifies and reaffirms the continuing effectiveness of all agreements entered into in connection with the Agreement.

7) Each Borrower represents and warrants that the representations and warranties contained in the Agreement are true and correct in all material respects as of the date of this Amendment (except that any representations and warranties that expressly refer to an earlier date shall be true and correct in all material respects as of such date, and except for representations and warranties that by their terms include a materiality qualification, which shall be true and correct in all respects).

8) This Amendment may be executed in two or more counterparts, each of which shall be deemed an original, but all of which together shall constitute one instrument.

9) As a condition to the effectiveness of this Amendment, Bank shall have received, in form and substance satisfactory to Bank, the following:

a) this Amendment, duly executed by each Borrower;

b) payment for all Bank Expenses incurred through the date of this Amendment, including Bank's expenses for the documentation of this Amendment and any UCC, good standing or intellectual property search or filing fees, which may be debited from any of Borrower's accounts; and

c) such other documents and completion of such other matters, as Bank may reasonably deem necessary or appropriate.

[Signature Page Follows]

IN WITNESS WHEREOF, the undersigned have executed this Amendment as of the first date above written.

PRECISION BIOSCIENCES, INC.

By: /s/ Abid Ansari
Name: Abid Ansari
Title: CFO

PACIFIC WESTERN BANK

By: _____
Name: _____
Title: _____

ELO LIFE SYSTEMS, INC.

By: /s/ Abid Ansari
Name: Abid Ansari
Title: CFO

[Signature Page to First Amendment to Loan and Security Agreement]

IN WITNESS WHEREOF, the undersigned have executed this Amendment as of the first date above written.

PRECISION BIOSCIENCES, INC.

By: _____
Name: _____
Title: _____

PACIFIC WESTERN BANK

By: /s/ Joseph Holmes Dague
Name: Joseph Holmes Dague
Title: Senior Vice President

ARTICLE 1.**ELO LIFE SYSTEMS, INC.**

By: _____
Name: _____
Title: _____

[Signature Page to First Amendment to Loan and Security Agreement]

SECOND AMENDMENT
TO
LOAN AND SECURITY AGREEMENT

This Second Amendment to Loan and Security Agreement (this "***Amendment***") is made and entered into as of December 3, 2019, by and among PACIFIC WESTERN BANK, a California state chartered bank ("***Bank***"), and PRECISION BIOSCIENCES, INC. and ELO LIFE SYSTEMS, INC. (individually and collectively, jointly and severally, "***Borrower***").

RECITALS

Borrower and Bank are parties to that certain Loan and Security Agreement dated as of May 15, 2019 (as amended from time to time, the "***Agreement***"). The parties desire to amend the Agreement in accordance with the terms of this Amendment.

NOW, THEREFORE, the parties agree as follows:

1) Section 6.6 of the Agreement is hereby amended and restated, as follows:

6.6 Primary Depository. At all times when the aggregate balance of Borrower's Cash at Bank and Bank's affiliates is less than the Deposit Account Threshold, Borrower shall maintain, and shall cause all of its Subsidiaries to maintain, all depository and operating accounts with Bank and all investment accounts with Bank or Bank's affiliates. At all times when the aggregate balance of Borrower's Cash at Bank and Bank's affiliates equals or exceeds the Deposit Account Threshold, Borrower and its Subsidiaries may maintain Cash balances that exceed the Deposit Account Threshold in depository, operating, and investments accounts outside of Bank or Bank's affiliates, so long as each such account outside of Bank is subject to a duly-executed account control agreement in favor of Bank, and in form and substance reasonably satisfactory to Bank. Notwithstanding the foregoing, Precision UK may maintain a bank account in the United Kingdom, with such account not subject to an account control agreement in favor of Bank, so long as the balance in such account does not exceed £1,500,000 (or its US Dollar equivalent) at any time. Prior to Borrower maintaining any investment accounts with Bank's affiliates, Borrower, Bank, and any such affiliate shall have entered into a securities account control agreement with respect to any such investment accounts, in form and substance reasonably satisfactory to Bank.

2) Section 7.13 of the Agreement is hereby amended and restated, as follows:

7.13 UK Subsidiary. Permit Precision UK to maintain cash exceeding £1,500,000 or non-cash assets exceeding a book value of $50,000 at any time.

3) Unless otherwise defined, all initially capitalized terms in this Amendment shall be as defined in the Agreement. The Agreement, as amended hereby, shall be and remain in full force and effect in accordance with its respective terms and hereby is ratified and confirmed in all respects. Except as expressly set forth herein, the execution, delivery, and performance of this Amendment shall not operate as a waiver of, or as an amendment of, any right, power, or remedy of Bank under the Agreement, as in effect prior to the date hereof. Each Borrower ratifies and reaffirms the continuing effectiveness of all agreements entered into in connection with the Agreement.

4) Each Borrower represents and warrants that the representations and warranties contained in the Agreement are true and correct in all material respects as of the date of this Amendment (except that any representations and warranties that expressly refer to an earlier date shall be true and correct in all material respects as of such

date, and except for representations and warranties that by their terms include a materiality qualification, which shall be true and correct in all respects).

5) This Amendment may be executed in two or more counterparts, each of which shall be deemed an original, but all of which together shall constitute one instrument.

6) As a condition to the effectiveness of this Amendment, Bank shall have received, in form and substance satisfactory to Bank, the following:

a) this Amendment, duly executed by each Borrower;

b) payment for all Bank Expenses incurred through the date of this Amendment, including Bank's expenses for the documentation of this Amendment and any UCC, good standing or intellectual property search or filing fees, which may be debited from any of Borrower's accounts; and

c) such other documents and completion of such other matters, as Bank may reasonably deem necessary or appropriate.

[Signature Page Follows]

IN WITNESS WHEREOF, the undersigned have executed this Amendment as of the first date above written.

PRECISION BIOSCIENCES, INC.

By: /s/Abid Ansari
Name: Abid Ansari
Title: CFO

PRECISION BIOSCIENCES, INC.

By: /s/Joseph Holmes Dague
Name: Joseph Holmes Dague
Title: Senior Vice President

ELO LIFE SYSTEMS, INC.

By: /s/Abid Ansari
Name: Abid Ansari
Title: CFO

[Signature Page to Second Amendment to Loan and Security Agreement]

THIRD AMENDMENT TO
LOAN AND SECURITY AGREEMENT

This Third Amendment to Loan and Security Agreement (this "***Amendment***") is entered into as of June 23, 2020, by and among PACIFIC WESTERN BANK, a California state chartered bank ("***Bank***"), and PRECISION BIOSCIENCES, INC. and ELO LIFE SYSTEMS, INC. (individually and collectively, jointly and severally, "***Borrower***").

RECITALS

Borrower and Bank are parties to that certain Loan and Security Agreement dated as of May 15, 2019 (as amended, restated, supplemented or otherwise modified from time to time, the "***Agreement***"). The parties desire to amend the Agreement in accordance with the terms of this Amendment, such amendment to become effective as of the Third Amendment Date.

NOW, THEREFORE, the parties agree as follows:

1) Amendments.

a) Section 2.1 (b) (i) of the Agreement is amended to read as follows:

(i) **Amount**. Subject to and upon the terms and conditions of this Agreement, Borrower may request Advances in an aggregate outstanding principal amount not to exceed the Revolving Line any time prior to the Revolving Maturity Date. Advances may be repaid and reborrowed at any time prior to the Revolving Maturity Date. On the Revolving Maturity Date, all Advances shall be immediately due and payable. Subject to Sections 2.5(c) and 2.5(f), Borrower may prepay any Advances without penalty or premium at any time.

b) Section 2.3 (a) (i) of the Agreement is amended to read as follows:

(i) **Advances.** Except as set forth in Section 2.3(b), the Advances shall bear interest, on the outstanding daily balance thereof, at a variable annual rate equal to the greater of (A) 2.75% above the Prime Rate, and (B) 6.00%.

c) Section 2.5 of the Agreement is amended to read as follows:

(a) **Facility Fee**. None.

(b) **Bank Expenses.** On the Closing Date, all Bank Expenses incurred through the Closing Date, and, after the Closing Date, all Bank Expenses, as and when they become due.

(c) **Early Termination Fee.** If this Agreement is terminated before the Revolving Maturity Date for any reason, including Bank's election to terminate following the occurrence of an Event of Default, on the date of such termination, a fee in an amount equal to Six Hundred Thousand Dollars ($600,000).

(d) **Unused Fee.** None.

(e) **Success Fee.** Upon the occurrence of a Success Fee Event, (i) a fee of $135,000 if paid on or before June 30, 2021, and (ii) a fee of $275,000 if paid after June 30, 2021 (the "Success Fee"). Borrower shall deliver reasonable advance written notice to Bank of a Success Fee Event, and shall pay Bank the Success Fee within five (5) days upon receipt of proceeds upon the consummation of a Success Fee Event. This Section 2.5(e) shall survive termination of this Agreement.

(f) Final Payment Fee. On the soonest to occur of (i) the Revolving Maturity Date, (ii) the date that Borrower repays all Advances and elects to terminate the Revolving Line, and (iii) the date that the Advances become due or Bank elects to terminate this Agreement in connection with the occurrence of an Event of Default, a fee equal to one percent (1.00%) of the maximum principal amount of the Advances outstanding at any time.

d) Section 6.2 (a) (iii) of the Agreement is amended to read as follows:

(iii) an annual budget approved by Borrower's Board of Directors as soon as available, but no later than the earlier of (i) 90 days after the end of each fiscal year of (ii) 15 days following approval by Borrower's Board of Directors.

e) Section 6.6 of the Agreement is amended to read as follows:

6.6 Primary Depository. Within 60 days after the Third Amendment Date, Borrower shall maintain and shall cause of its Subsidiaries to maintain the lesser of (a) $100,000,000, or (b) substantially all cash (other than cash held in Excluded Accounts) in depositary and operating accounts with Bank, provided all cash held outside Bank shall be subject to an account control agreement in favor of Bank. Notwithstanding the foregoing, Precision UK may maintain a bank account in the United Kingdom, with such account not subject to an account control agreement in favor of Bank, so long as the balance in such account does not exceed £1,500,000 (or its US Dollar equivalent) at any time.

f) Section 6.7 of the Agreement is amended to read as follows:

6.7 Financial Covenants. Borrower shall at all times maintain the following covenant:

(a) Minimum Cash. At all times, an aggregate balance of unrestricted cash at Bank (excluding any amounts held in Excluded Accounts) equal to or greater than $10,000,000. Borrower acknowledges and agrees that any request by Borrower or any other Person to pay or otherwise transfer funds that would cause Borrower's balance of Cash at Bank to be less than the amount required pursuant to this Section 6.7(a) shall constitute an Event of Default under this Agreement.

g) Exhibit A to the Agreement is amended by amending or restating, or adding, in appropriate alphabetical order, as applicable, the following defined terms to read as follows:

"Credit Card Maturity Date" means June 23, 2022, provided that if Borrower achieves the Extension Milestone, then "Credit Card Maturity Date" shall instead mean June 23, 2023.

"Extension Milestone" means Borrower has delivered evidence acceptable to Bank that Borrower has received aggregate gross Cash proceeds of not less than $125,000,000 from the issuance of Borrower's equity securities and/or upfront Cash proceeds from strategic partnerships on terms and conditions reasonably satisfactory to Bank.

"Revolving Line" means a Credit Extension of up to $30,000,000.

"Revolving Maturity Date" means June 23, 2022, provided that if Borrower achieves the Extension Milestone, then "Revolving Maturity Date" shall instead mean June 23, 2023.

"Success Fee Event" is (a) any merger or consolidation of Borrower with or into another entity (except one in which the holders of equity of the Borrower immediately prior to such merger or consolidation continue to hold at least a majority of the voting power of the equity interests in the surviving entity), (b) any sale of all or substantially all of the assets of Borrower and its Subsidiaries taken as a whole (in one or more related

and contemporaneous transactions), or (c) closing of one or more related and contemporaneous sales or issuances of Borrower's equity or Subordinated Debt securities and/or up-front cash proceeds from one or more strategic partnerships in which the aggregate gross cash proceeds to Borrower are at least $50,000,000.

"Third Amendment Date" means June 23, 2020.

h) Exhibit D to the Agreement is amended as set forth in Exhibit D attached hereto.

2) Unless otherwise defined, all initially capitalized terms in this Amendment shall be as defined in the Agreement. The Agreement, as amended hereby, shall be and remain in full force and effect in accordance with its terms. Except as expressly set forth herein, the execution, delivery, and performance of this Amendment shall not operate as a waiver of, or as an amendment of, any right, power, or remedy of Bank under the Agreement, as in effect prior to the date hereof. Borrower ratifies and reaffirms the continuing effectiveness of all agreements entered into in connection with the Agreement and the security interest as granted as of the Closing Date continues without novation. Unused Fees accruing before the Third Amendment Date are not refundable. The Early Termination Fee provided for in Section 2.5(c) in effect before the Third Amendment Date is superseded by the fee provided for in this Amendment in respect of Section 2.5(c).

3) Borrower represents and warrants that the representations and warranties contained in the Agreement are true and correct in all material respects as of the date of this Amendment (provided, that those representations and warranties expressly referring to another date are true and correct in all material respects as of such date, and provided further that any representation or warranty that contains a materiality qualification therein is true and correct in all respects). No Event of Default or failure of condition has occurred or exists, or would exist with notice or lapse of time or both under the Agreement or any other Loan Document. A true and correct copy of each of Borrower's certificate of incorporation and bylaws, as in effect as of the Third Amendment Date has been delivered to Bank.

4) This Amendment and any documents executed in connection herewith or pursuant hereto contain the entire agreement between the parties with respect to the subject matter hereof and supersede all prior agreements, understandings, offers and negotiations, oral or written, with respect thereto and no extrinsic evidence whatsoever may be introduced in any judicial or arbitration proceeding, if any, involving this Amendment; except that any financing statements or other agreements or instruments filed by Bank with respect to Borrower remain in full force and effect.

5) This Amendment may be executed in two or more counterparts, each of which shall be deemed an original, but all of which together shall constitute one instrument.

6) The terms of Article 11 of the Agreement are incorporated by reference herein, *mutatis mutandis*.

7) As a condition to the effectiveness of this Amendment, Bank shall have received, in form and substance reasonably satisfactory to Bank, the following:

a) this Amendment, duly executed by Borrower and Bank;

b) an officer's certificate of Borrower with respect to incumbency and resolutions authorizing the execution and delivery of this Amendment;

c) payment of Bank Expenses, which may be debited from any of Borrower's deposit account maintained with Bank; and

d) such other documents and completion of such other matters, as Bank may reasonably deem necessary or appropriate.

[SIGNATURE PAGE FOLLOWS]

[SIGNATURE PAGE TO THIRD AMENDMENT TO LOAN AND SECURITY AGREEMENT]

IN WITNESS WHEREOF, the undersigned have executed this Amendment as of the first date above written.

PRECISION BIOSCIENCES, INC.

By: /s/ Abid Ansari
Name: Abid Ansari
Title: CFO

ELO LIFE SYSTEMS, INC.

By: /s/ Fayaz Khazi
Name: Fayaz Khazi
Title: CEO

PACIFIC WESTERN BANK

By: /s/ Scott Hansen
Name: Scott Hansen
Title: EVP

EXHIBIT D

COMPLIANCE CERTIFICATE

[***]

SCHEDULE OF EXCEPTIONS

Permitted Indebtedness (Exhibit A) – [***]

Permitted Investments (Exhibit A) – [***]

Permitted Liens (Exhibit A) – [***]

Prior Names (Section 5.5) –

Elo Life Systems, Inc. was formerly known as Precision PlantSciences, Inc.

Litigation (Section 5.6) – [***]

Inbound Licenses (Section 5.12) – [***]

FOURTH AMENDMENT
TO
LOAN AND SECURITY AGREEMENT

This Fourth Amendment to Loan and Security Agreement (this "***Amendment***") is made and entered into as of December 3, 2020, by and among PACIFIC WESTERN BANK, a California state chartered bank ("***Bank***"), and PRECISION BIOSCIENCES, INC. and ELO LIFE SYSTEMS, INC. (individually and collectively, jointly and severally, "***Borrower***").

RECITALS

Borrower and Bank are parties to that certain Loan and Security Agreement dated as of May 15, 2019 (as amended from time to time, the "***Agreement***"). The parties desire to amend the Agreement in accordance with the terms of this Amendment.

NOW, THEREFORE, the parties agree as follows:

1) Bank hereby waives any and all of Borrower's violations of the Primary Depository covenant, as more particularly described in Section 6.6 of the Agreement (as such section was in effect immediately prior to the effectiveness of this Amendment), occurring on or before the date hereof, for maintaining cash in an account outside of Bank not subject to an account control agreement in favor of Bank.

2) Section 6.6 of the Agreement is hereby amended and restated, as follows:

6.6 Primary Depository. Borrower shall maintain and shall cause all of its Subsidiaries to maintain the lesser of (a) $100,000,000, or (b) substantially all cash (other than cash held in Excluded Accounts) in depository and operating accounts with Bank, provided all cash held outside Bank shall be subject to an account control agreement in favor of Bank. Notwithstanding the foregoing, (a) Precision UK may maintain a bank account in the United Kingdom, with such account not subject to an account control agreement in favor of Bank, so long as the balance in such account does not exceed £1,500,000 (or its US Dollar equivalent) at any time, and (b) ELO Australia may maintain a bank account with National Australia Bank, with such account not subject to an account control agreement in favor of Bank, so long as the balance in such account does not exceed $250,000 AUD (or its US Dollar equivalent) at any time.

3) The following defined term is hereby added to Exhibit A of the Agreement, as follows:

"ELO Australia" means ELO Life Systems Australia Pty LTD, a proprietary limited company formed under the laws of Australia and a wholly owned Subsidiary of ELO Life Systems, Inc.

4) Unless otherwise defined, all initially capitalized terms in this Amendment shall be as defined in the Agreement. The Agreement, as amended hereby, shall be and remain in full force and effect in accordance with its respective terms and hereby is ratified and confirmed in all respects. Except as expressly set forth herein, the execution, delivery, and performance of this Amendment shall not operate as a waiver of, or as an amendment of, any right, power, or remedy of Bank under the Agreement, as in effect prior to the date hereof. Each Borrower ratifies and reaffirms the continuing effectiveness of all agreements entered into in connection with the Agreement.

5) Each Borrower represents and warrants that the representations and warranties contained in the Agreement are true and correct in all material respects as of the date of this Amendment (except that any representations and warranties that expressly refer to an earlier date shall be true and correct in all material

respects as of such date, and except for representations and warranties that by their terms include a materiality qualification, which shall be true and correct in all respects).

6) This Amendment may be executed in two or more counterparts, each of which shall be deemed an original, but all of which together shall constitute one instrument.

7) As a condition to the effectiveness of this Amendment, Bank shall have received, in form and substance satisfactory to Bank, the following:

    a. this Amendment, duly executed by each Borrower;

    b. payment for all Bank Expenses incurred through the date of this Amendment, including Bank's expenses for the documentation of this Amendment and any UCC, good standing or intellectual property search or filing fees, which may be debited from any of Borrower's accounts; and

    c. such other documents and completion of such other matters, as Bank may reasonably deem necessary or appropriate.

[Signature Page Follows]

IN WITNESS WHEREOF, the undersigned have executed this Amendment as of the first date above written.

PRECISION BIOSCIENCES, INC.

By: /s/ Abid Ansari_
Name: Abid Ansari_
Title: CFO

PACIFIC WESTERN BANK

By: /s/ Ashley N. Pittman
Name: Ashley N. Pittman
Title: SVP

ELO LIFE SYSTEMS, INC.

By: /s/ Fayaz Khazi
Name: Fayaz Khazi
Title: CEO

[Signature Page to Fourth Amendment to Loan and Security Agreement]

CONSENT AND FIFTH AMENDMENT
TO
LOAN AND SECURITY AGREEMENT

This Consent and Fifth Amendment to Loan and Security Agreement (the "***Amendment***"), is entered into as of May 18, 2021, by and among PACIFIC WESTERN BANK, a California state chartered bank (the "***Bank***") and PRECISION BIOSCIENCES, INC. ("***Precision***") and ELO LIFE SYSTEMS, INC. ("***ELO***", and individually and collectively, jointly and severally, with Precision, the ***"Borrower"***).

RECITALS

Borrower and Bank are parties to that certain Loan and Security Agreement dated as of May 15, 2019 (as amended from time to time, the "***Agreement***"). The parties desire to amend the Agreement in accordance with the terms of this Amendment.

NOW, THEREFORE, the parties agree as follows:

1) Contingent upon the upfront re-purchase price not exceeding $25,000,000 and no more than $2,000,000 of such re-purchase price being paid in cash, Bank hereby consents to Precision entering into the Program Purchase Agreement, dated on or about April 9, 2021, in substantially the form delivered to Bank on the date of this Amendment (the "PPA"), which when effective will (i) terminate that certain Development and Commercial License Agreement, effective February 24, 2016, as amended, by and among Precision, Les Laboratoires Servier, a corporation incorporated under the laws of France having a principal place of business at 50 rue Carnot, 92150 Suresnes, France ("LLS") and Institut De Recherches Internationales Servier, a corporation incorporated under the laws of France having its principal place of business at 50 rue Carnot, 92150 Suresnes, France ("IRIS") (LLS and IRIS together jointly and severally, "Servier"), and (ii) result in Precision re-acquiring the rights of Servier under the Reversion Program (as defined in the PPA).
2) Subject to the Obligations (as defined in the ELO LSA) thereunder being guaranteed by Precision, Bank hereby consents to ELO entering into a Loan and Security Agreement with Bank (the "ELO LSA"), under which Bank agrees to make a term loan to Borrower in an aggregate principal amount not to exceed $2,500,000.
3) Section 6.8(a) of the Agreement is hereby amended and restated, as follows:

   (a) Within 30 days after the last day of each quarter, Borrower shall promptly give Bank written notice of any applications or registrations of intellectual property rights filed with the United States Patent and Trademark Office, including the date of such filing and the registration or application numbers, if any.
4) The following definition in Exhibit A to the Agreement is hereby amended and restated, as follows:

   "Shares" means one hundred percent (100%) of the issued and outstanding capital stock, membership units, or other securities owned or held of record by Borrower in any Subsidiary of Borrower.
5) No course of dealing on the part of Bank or its officers, nor any failure or delay in the exercise of any right by Bank, shall operate as a waiver thereof, and any single or partial exercise of any such right shall not preclude any later exercise of any such right. Bank's failure at any time to require strict performance

by Borrower of any provision shall not affect any right of Bank thereafter to demand strict compliance and performance. Any suspension or waiver of a right must be in writing signed by an officer of Bank.

6) Unless otherwise defined, all initially capitalized terms in this Amendment shall be as defined in the Agreement. The Agreement, as amended hereby, shall be and remain in full force and effect in accordance with its respective terms and hereby is ratified and confirmed in all respects. Except as expressly set forth herein, the execution, delivery, and performance of this Amendment shall not operate as a waiver of, or as an amendment of, any right, power, or remedy of Bank under the Agreement, as in effect prior to the date hereof. Borrower ratifies and reaffirms the continuing effectiveness of all agreements entered into in connection with the Agreement.
7) Borrower represents and warrants that the representations and warranties contained in the Agreement are true and correct as of the date of this Amendment, and that no Event of Default has occurred and is continuing.
8) This Amendment may be executed in two or more counterparts, each of which shall be deemed an original, but all of which together shall constitute one instrument.
9) As a condition to the effectiveness of this Amendment, Bank shall have received, in form and substance satisfactory to Bank, the following:
    a) this Amendment, duly executed by Borrower;
    b) an officer’s certificate of Borrower with respect to incumbency and resolutions authorizing the execution and delivery of this Amendment;
    c) payment of all Bank expenses, including Bank’s expenses for the documentation of this amendment and any related documents, and any UCC, good standing or intellectual property search or filing fees, which may be debited from any of Borrower's accounts; and
    d) such other documents and completion of such other matters, as Bank may reasonably deem necessary or appropriate.

IN WITNESS WHEREOF, the undersigned have executed this Amendment as of the first date above written.

PRECISION BIOSCIENCES, INC.

By: /s/ John Alexander Kelly
Name: John Alexander Kelly
Title: Interim Chief Financial Officer

PACIFIC WESTERN BANK

By: /s/ Ashley Pittman
Name: Ashley Pittman
Title: SVP

ELO LIFE SYSTEMS, INC.
By: /s/ Fayaz Khazi
Name: Fayaz Khazi
Title: CEO

CONSENT AND SIXTH AMENDMENT
TO
LOAN AND SECURITY AGREEMENT

This Consent and Sixth Amendment to Loan and Security Agreement (this "***Amendment***"), is entered into as of December 17, 2021, by and among PACIFIC WESTERN BANK, a California state-chartered bank (the "***Bank***"), PRECISION BIOSCIENCES, INC. ("***Precision***"), and ELO LIFE SYSTEMS, INC. ("***ELO***", and individually and collectively, jointly and severally, with Precision, the "***Borrower***").

RECITALS

Borrower and Bank are parties to that certain Loan and Security Agreement dated as of May 15, 2019 (as has been and may be further amended from time to time, the "***Agreement***"). The parties desire to amend the Agreement in accordance with the terms of this Amendment.

NOW, THEREFORE, the parties agree as follows:

1) Precision, ELO, and AccelR8 Venture Fund I LLC, a Delaware limited liability company ("***AccelR8***") have executed a Letter of Intent (see Appendix I) to establish the principal terms pursuant to which (i) substantially all of the assets of ELO will be spun-out from Precision; (ii) ELO and Precision will enter into (a) a Contribution Agreement (see Appendix II) relating to the creation of a new company, Epsilon Holdings, Inc., a Delaware corporation ("***New ELO***"), which will own substantially all of the assets and will assume certain liabilities of ELO, and (b) an Inter-Company License Agreement (see Appendix III), under which Precision will grant a royalty-free license to New ELO to use certain of Precision's technology for plant and other specified applications; and (iii) New ELO will complete an offering of its Series A Preferred Stock in a financing round (the "***Series A Round***") led by AccelR8 ((i), (ii), and (iii) being collectively, the "***Contemplated Transactions***").
2) As consideration for the Contemplated Transactions, Precision will (i) receive a nonconvertible promissory note in the face amount of Ten Million Dollars ($10,000,000) payable by New ELO (the "***New ELO Note***"), and (ii) New ELO will issue to Precision 14,284 shares of common stock or approximately thirty-one percent (31%) of the fully-diluted ownership of New ELO, as adjusted for the closing of the Series A Round.
3) Subject to the Obligations (as defined in that certain Loan and Security Agreement, dated May 19, 2021, by and between Bank and ELO) being indefeasibly repaid in full, Bank hereby consents to Borrower entering into the Contemplated Transactions.
4) Bank hereby consents to the dissolution and winding up of ELO following the consummation of the Contemplated Transactions in accordance with applicable law. Immediately upon a certificate of dissolution filed with the Secretary of State of the State of Delaware becoming effective, all references to "Borrower" in the Agreement shall be deemed to refer only to Precision and not to ELO.
5) Section 2.1(b)(ii) of the Agreement is hereby amended by deleting the phrase "by facsimile transmission or email to be received no later than 3:30 p.m. Eastern time" and replacing it with the phrase "by email (or, if permitted by Bank, through the use of an E-System) to be received no later than 3:30 p.m. Eastern time".
6) Section 5.7 of the Agreement is hereby amended by deleting the phrase "that are delivered by Borrower to Bank fairly present in all material respects" and replacing it with the phrase "that are delivered by

Borrower to Bank or otherwise submitted to Bank fairly present in all material respects".

7) Section 5.14 of the Agreement is hereby amended and restated as follows:

5.14 Full Disclosure. No representation, warranty or other statement made by Borrower in any report, certificate, or written statement furnished or submitted to Bank taken together with all such reports, certificates, and written statements furnished or submitted to Bank contains any untrue statement of a material fact or omits to state a material fact necessary to make the statements contained in such reports, certificates, or statements not misleading in light of the circumstances in which they were made, it being recognized by Bank that the projections and forecasts provided by Borrower in good faith and based upon reasonable assumptions are not to be viewed as facts and that actual results during the period or periods covered by any such projections and forecasts may differ from the projected or forecasted results.

8) The last paragraph of Section 6.2 of the Agreement is hereby deleted in its entirety and replaced with the following two paragraphs, as follows:

Borrower may deliver to Bank on an electronic basis any certificates, reports, requests, or information required pursuant to this Section 6.2, and Bank shall be entitled to rely on the information contained in the electronic files, provided that Bank in good faith believes that the files were delivered by, or on behalf of, a Responsible Officer. Borrower shall include a submission date on any certificates, statements, and reports to be delivered electronically.

Any submission by Borrower of a Compliance Certificate, Borrowing Base Certificate or other financial statement pursuant to this Section 6.2 or otherwise submitted to Bank shall be deemed to be a representation by Borrower that (i) as of the date of such Compliance Certificate, Borrowing Base Certificate, financial statement, or request, the information and calculations set forth therein are true, accurate and correct, (ii) as of the end of the compliance period set forth in such submission, Borrower is in complete compliance with all required covenants except as noted in such Compliance Certificate, Borrowing Base Certificate or financial statement, as applicable; (iii) as of the date of such submission, no Events of Default have occurred or are continuing; and (iv) all representations and warranties other than any representations or warranties that are made as of a specific date in Section 5 remain true and correct in all material respects as of the date of such submission except as noted in such Compliance Certificate, Borrowing Base Certificate, financial statement, or request, as applicable.

9) Section 8.8 of the Agreement is hereby amended and restated as follows:

8.8 Misrepresentations. If any material misrepresentation or material misstatement exists now or hereafter in any warranty or representation set forth herein or in any report, certificate or other writing delivered to Bank by any Responsible Officer pursuant to this Agreement or to induce Bank to enter into this Agreement or any other Loan Document.

10) Section 12.6 of the Agreement is hereby amended and restated as follows:

12.6 Counterparts; Electronic Transmission; Electronic Signatures. This Agreement may be executed in any number of counterparts and by different parties on separate counterparts, each of which, when executed and delivered, shall be deemed to be an original, and all of which, when taken together, shall constitute but one and the same Agreement. Executed copies of this Agreement or the signature pages of this Agreement sent by facsimile or

transmitted electronically in Portable Document Format ("PDF") or any similar format, or transmitted electronically by digital image, DocuSign, or other means of electronic transmission, shall be treated as originals, fully binding and with full legal force and effect, and the parties waive any rights they may have to object to such treatment. The words "execution," "signed," "signature," "delivery," and words of like import in or relating to this Agreement and/or any document to be signed in connection with this Agreement and the transactions contemplated hereby shall be deemed to include Electronic Signatures (as defined below), deliveries or the keeping of records in electronic form, each of which shall be of the same legal effect, validity or enforceability as a manually executed signature, physical delivery thereof or the use of a paper-based recordkeeping system, as the case may be. As used herein, "Electronic Signatures" means any electronic symbol or process attached to, or associated with, any contract or other record and adopted by a person with the intent to sign, authenticate or accept such contract or record.

11) A new Section 12.9 is hereby added to the Agreement, as follows:

12.9 E-Systems. Bank is hereby authorized by Borrower to establish procedures (and to amend such procedures from time to time) to facilitate administration and servicing of the Credit Extensions and other matters incidental thereto. Without limiting the generality of the foregoing, Bank is hereby authorized to establish procedures to make available or deliver, or to accept, notices, documents and similar items, by posting to or submitting and/or completion, on E-Systems. Borrower acknowledges and agrees that the use of transmissions via an E-System or electronic mail is not necessarily secure and that there are risks associated with such use, including risks of interception, disclosure and abuse, and Borrower assumes and accepts such risks by hereby authorizing the transmission via E-Systems or electronic mail. All uses of an E-System shall be governed by and subject to, in addition to this Section, the separate terms and conditions posted or referenced in such E-System (or such terms and conditions as may be updated from time to time, including on such E-System) and related contractual obligations executed by Borrower in connection with the use of such E-System. ALL E-SYSTEMS AND ELECTRONIC TRANSMISSIONS SHALL BE PROVIDED "AS-IS" AND "AS AVAILABLE". NO REPRESENTATION OR WARRANTY OF ANY KIND IS MADE BY BANK OR ANY OF ITS AFFILIATES IN CONNECTION WITH ANY ESYSTEMS.

12) Section 13.1 of the Agreement is hereby amended and restated, as follows:

13.1 Primary Obligation. This Agreement is a primary and original obligation of each Borrower and shall remain in effect notwithstanding future changes in conditions, including any change of law or any invalidity or irregularity in the creation or acquisition of any Obligations or in the execution or delivery of any agreement between Bank and any Borrower. Each Borrower shall be liable for existing and future Obligations as fully as if all of all Credit Extensions were advanced to such Borrower. Bank may rely on any certificate, report, or representation made by any Borrower as made on behalf of, and binding on, all Borrowers, including without limitation any Disbursement Request Forms, Borrowing Base Certificates, Compliance Certificates, and Accordion Option Request.

13) Exhibit A to the Agreement is hereby amended by adding the defined term and its definition thereto, in the appropriate alphabetical order:

"E-System" means any electronic system approved by Bank, including any Internet or extranet-based site, whether such electronic system is owned, operated or hosted by Bank, any of its Affiliates or any other Person, providing for access to data protected by passcodes or other

security system, or otherwise used to facilitate communication between Borrower and Bank with respect to the Loan Documents.

14) The following definition in Exhibit A to the Agreement is hereby amended and restated, as follows:

> "Shares" means (i) one hundred percent (100%) of the issued and outstanding capital stock, membership units, or other securities owned or held of record by Borrower in any Subsidiary of Borrower and (ii) all of the issued and outstanding common stock owned or held of record by Borrower in Epsilon Holdings, Inc., a Delaware corporation.

15) No course of dealing on the part of Bank or its officers, nor any failure or delay in the exercise of any right by Bank, shall operate as a waiver thereof, and any single or partial exercise of any such right shall not preclude any later exercise of any such right. Bank's failure at any time to require strict performance by Borrower of any provision shall not affect any right of Bank thereafter to demand strict compliance and performance. Any suspension or waiver of a right must be in writing signed by an officer of Bank.
16) Unless otherwise defined, all initially capitalized terms in this Amendment shall be as defined in the Agreement. The Agreement, as amended hereby, shall be and remain in full force and effect in accordance with its respective terms and hereby is ratified and confirmed in all respects. Except as expressly set forth herein, the execution, delivery, and performance of this Amendment shall not operate as a waiver of, or as an amendment of, any right, power, or remedy of Bank under the Agreement, as in effect prior to the date hereof. Borrower ratifies and reaffirms the continuing effectiveness of all agreements entered into in connection with the Agreement.
17) Borrower represents and warrants that the representations and warranties contained in the Agreement are true and correct as of the date of this Amendment, and that no Event of Default has occurred and is continuing.
18) This Amendment may be executed in any number of counterparts and by different parties on separate counterparts, each of which, when executed and delivered, shall be deemed to be an original, and all of which, when taken together, shall constitute but one and the same Amendment. Executed copies of this Amendment or the signature pages of this Amendment sent by facsimile or transmitted electronically in Portable Document Format ("PDF") or any similar format, or transmitted electronically by digital image, DocuSign, or other means of electronic transmission, shall be treated as originals, fully binding and with full legal force and effect, and the parties waive any rights they may have to object to such treatment. The words "execution," "signed," "signature," "delivery," and words of like import in or relating to this Amendment and/or any document to be signed in connection with this Amendment and the transactions contemplated hereby shall be deemed to include Electronic Signatures (as defined below), deliveries or the keeping of records in electronic form, each of which shall be of the same legal effect, validity or enforceability as a manually executed signature, physical delivery thereof or the use of a paper-based recordkeeping system, as the case may be. As used herein, "Electronic Signatures" means any electronic symbol or process attached to, or associated with, any contract or other record and adopted by a person with the intent to sign, authenticate or accept such contract or record.

19) As a condition to the effectiveness of this Amendment, Bank shall have received, in form and substance satisfactory to Bank, the following:
   a) this Amendment, duly executed by Borrower;
   b) an officer’s certificate of each Borrower with respect to incumbency and resolutions authorizing the execution and delivery of this Amendment;
   c) a collateral assignment of the New ELO Note, duly executed by Precision;
   d) a Stock Power, duly executed by Precision in blank, for the shares of New ELO common stock issued to Precision in connection with the Contemplated Transactions;
   e) payment of all Bank expenses, including Bank’s expenses for the documentation of this Amendment and any related documents, and any UCC, good standing or intellectual property search or filing fees, which may be debited from any of Borrower's accounts; and
   f) such other documents and completion of such other matters, as Bank may reasonably deem necessary or appropriate.

[Signatures appear on the following page.]

IN WITNESS WHEREOF, the undersigned have executed this Amendment as of the first date above written.

PRECISION BIOSCIENCES, INC.

By: /s/ John Alexander Kelly
Name: John Alexander Kelly
Title: Chief Financial Officer

PACIFIC WESTERN BANK

By: /s/ Ashley Pittman
Name: Ashley Pittman
Title: SVP Portfolio Manager

ELO LIFE SYSTEMS, INC.
By: /s/ Dario Scimeca
Name: Dario Scimeca
Title: General Counsel & Secretary

APPENDIX I
LETTER OF INTENT

[***]

APPENDIX II
CONTRIBUTION AGREEMENT

[***]

APPENDIX III
INTER-COMPANY LICENSE AND ASSIGNMENT AGREEMENT

[***]

EXHIBIT C
IP Assignment

[***]

Exhibit 10.12

LEASE

BIOPOINT INNOVATION LABS

DURHAM TW ALEXANDER, LLC,

a Delaware limited liability company

as Landlord,

and

PRECISION BIOSCIENCES, INC.,

a Delaware corporation,

as Tenant.

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BIOPOINT INNOVATION LABS

LEASE

This Lease (the "**Lease**"), dated as of the date set forth in Section 1 of the Summary of Basic Lease Information (the "**Summary**"), below, is made by and between **DURHAM TW ALEXANDER, LLC,** a Delaware limited liability company ("**Landlord**"), and **PRECISION BIOSCIENCES, INC.**, a Delaware corporation ("**Tenant**").

SUMMARY OF BASIC LEASE INFORMATION

TERMS OF LEASE		DESCRIPTION
1.	Date:	October 2nd, 2018
2.	Premises (Article 1).	
	2.1 Building:	That certain office building containing approximately 148,989 rentable square feet of space located at 20 TW Alexander Drive, Research Triangle Park, NC 27709.
	2.2 Premises:	Approximately 17,296 rentable square feet of space on the first (1st) floor of the Building and commonly known as Suite 130, as further set forth in **Exhibit C** to the Lease.
3.	Lease Term (Article 2).	
	3.1 Length of Term:	Eighty-six (86) months.
	3.2 Lease Commencement Date:	The date of Lease execution.
	3.3 Rent Commencement Date:	Nine (9) months after the Lease Commencement Date.
	3.4 Lease Expiration Date:	Eighty-six (86) months after the Rent Commencement Date.

4. Base Rent (Article 3):

Time Period	Annual Base Rent	Monthly Installment of Base Rent	Annual Base Rent per Rentable Square Foot
Year 1**	$449,696.04	$37,474.67	$26.00
Year 2	$463,186.92	$38,598.91	$26.78
Year 3	$477,023.64	$39,751.97	$27.58
Year 4	$491,379.36	$40,948.28	$28.41
Year 5	$506,080.92	$42,173.41	$29.26
Year 6	$521,301.48	$43,441.79	$30.14
Year 7	$537,040.80	$44,753.40	$31.05

Year 8	$553,126.08	$46,093.84	$31.98

*Note: Provided Tenant is not in default of the terms of this Lease, after expiration of any applicable notice and cure period, Tenant shall have no obligation to pay any Base Rent attributable to the first two (2) months of the Lease Term following the Rent Commencement Date (the "**Abatement Period**"). Tenant shall be obligated to pay Tenant's Share of Direct Expenses attributable to the Abatement Period.

5.	Tenant Improvements Allowance:	The improvements in the Premises shall be constructed in accordance with the terms of the Tenant Work Letter attached hereto as **Exhibit D** up to a cost of $70.58 per rentable square foot.
6.	NNN Lease.	In addition to the Base Rent, Tenant shall be responsible to pay Tenant's Share of Direct Expenses in accordance with the terms of Article 4 of the Lease.
7.	Tenant's Share (Article 4):	Approximately 11.61%.
8.	Permitted Use (Article 5):	The Premises may only be used for any or all of the following uses: general office, research and development, engineering, GMP manufacturing, laboratory, storage and/or warehouse uses, including, but not limited to, administrative offices and other lawful uses reasonably related to or incidental to such specified uses, all (i) consistent with substantially similar life sciences and/or office projects in the Durham, North Carolina area ("**First Class Life Sciences Projects**"), and (ii) in compliance with, and subject to, all Applicable Laws (as defined herein), and the terms of this Lease.
9.	Security Deposit (Article 21):	$149,898.68 So long as Tenant is not in default under this Lease beyond applicable notice and cure periods at any time during the first three (3) years of the Lease Term then thereafter the Security Deposit shall be reduced to $112,424.01. So long as Tenant is not in default under this Lease beyond applicable notice and cure periods at any time during the first five (5) years of the Lease Term then thereafter the Security Deposit shall be reduced to $74,949.34 for the remainder of the Lease Term. In such event, if the Security Deposit has been posted in the form of a cash deposit Landlord shall refund the additional amount to Tenant within thirty (30) days and if the Security Deposit is in the form of a letter of credit then Landlord shall return the existing letter of credit to Tenant upon Tenant's posting of a new letter of credit in the correct amount or the posting of a cash deposit by Tenant.
10.	Parking Pass Ratio (Article 28):	2.5 unreserved parking spaces for every 1,000 rentable square feet of the Premises, subject to the terms of Article 28 of the Lease.

11.	Address of Tenant (Section 29.18):	PRECISION BIOSCIENCES, INC. 302 E. Pettigrew ST. Durham, NC 27701 Attention: Sinu Bhandaru, Director, Head of Operations & IT With a Copy of any default notices to: Smith, Anderson, Blount, Dorsett, Mitchell & Jernigan, L.L.P. Post Office Box 2611 Raleigh, North Carolina 27602-2611 Attention: Michael P. Saber, Esq. overnight delivery address: Smith, Anderson, Blount, Dorsett, Mitchell & Jernigan, L.L.P. 2300 Wells Fargo Capitol Center 150 Fayetteville Street Raleigh, North Carolina 27601
12.	Address of Landlord (Section 29.18):	See Section 29.18 of the Lease.
13.	Broker(s) (Section 29.24):	Cushman & Wakefield
14.	Guarantor(s) (Section 29.33):	None ("**Guarantors**")

1. PREMISES, BUILDING, PROJECT, AND COMMON AREAS

1.1 **Premises, Building, Project and Common Areas**.

1.1.1 **The Premises**. Landlord hereby leases to Tenant and Tenant hereby leases from Landlord the premises set forth in Section 2.2 of the Summary (the "**Premises**"). The outline of the Premises is set forth in **Exhibit C** attached hereto and has the number of rentable square feet as set forth in Section 2.2 of the Summary. The parties hereto agree that the lease of the Premises is upon and subject to the terms, covenants and conditions herein set forth, and Tenant covenants as a material part of the consideration for this Lease to keep and perform each and all of such terms, covenants and conditions by it to be kept and performed and that this Lease is made upon the condition of such performance. The parties hereto hereby acknowledge that the purpose of **Exhibit C** is to show the approximate location of the Premises in the "Building," as that term is defined in Section 1.1.2, below, only, and such Exhibit is not meant to constitute an agreement, representation or warranty as to the construction of the Premises, the precise area thereof or the specific location of the "Common Areas," as that term is defined in Section 1.1.3, below, or the elements thereof or of the accessways to the Premises or the "Project," as that term is defined in Section 1.1.2, below. Tenant shall accept the Premises in its presently existing "as-is" condition and Landlord shall not be obligated to provide or pay for any improvement work or services related to the improvement of the Premises except Landlord shall deliver the Premises in broom clean condition, with all currently existing Premises systems in good working order (provided that (i) Tenant acknowledges and agrees that demolition work has been performed to a portion of the space, separating same from the remaining, functioning standard office portion; and (ii) Tenant shall promptly notify Landlord of any known/discovered defects or needed repairs to same so that Landlord may fulfill any repair obligations under Section 7.3 of this Lease), and except as otherwise expressly set forth in this Lease or in the Tenant Work Letter attached hereto as **Exhibit D**.

The Premises shall exclude Common Areas, including without limitation exterior faces of exterior walls, the entry, vestibules and main lobby of the Building, lobbies and common lavatories, the common stairways and stairwells, boiler room, sprinkler rooms, mechanical rooms, loading and receiving areas, electric and telephone closets, janitor closets, and pipes, ducts, conduits, wires and appurtenant fixtures and equipment serving exclusively or in common with other parts of the Building..

1.1.2 **The Building and The Project**. The Premises are a part of the building set forth in Section 2.1 of the Summary (the "**Building**"). The term "**Project**," as used in this Lease, shall mean (i) the Building and the Common Areas, (ii) the land (which is improved with landscaping, parking facilities and other improvements) upon which the Building and the Common Areas are located, (iii) the other buildings located in the project known as "BioPoint Innovation Labs", and the land upon which such adjacent buildings are located, and (iv) at Landlord's discretion, any additional real property, areas, land, buildings or other improvements added thereto outside of the Project. Landlord may only own portions of the Project and any rights granted within portions of the Project not owned by Landlord shall be pursuant to recorded declarations and easements to the extent such documents exist.

1.1.3 **Common Areas**. Tenant shall have the non-exclusive right to use in common with other tenants in the Project, and subject to the Rules and Regulations referred to in Article 5 of this Lease, those portions of the Project which are provided, from time to time, for use in common by Landlord, Tenant and any other tenants of the Project (such areas, together with such other portions of the Project designated by Landlord, in its discretion, including certain areas designated for the exclusive use of certain tenants, or to be shared by Landlord and certain tenants, are collectively referred to herein as the "**Common Areas**"). The Common Areas shall consist of the "**Project Common Areas**" and the "**Building Common Areas**." The term "**Project Common Areas**," as used in this Lease, shall mean the portion of the Project designated as such by Landlord or areas within the Project that the occupants of the Building are permitted to utilize pursuant to a recorded declaration and which areas shall be maintained in accordance with the declaration. The term "**Building Common Areas**," as used in this Lease, shall mean the portions of the Common Areas located within the Building reasonably designated as such by Landlord. The manner in which the Common Areas are maintained and operated shall be at the reasonable discretion of Landlord and the use thereof shall be subject to the Rules and Regulations as Landlord may make from time to time. Landlord reserves the right to close temporarily, make alterations or additions to, or change the location of elements of the Project and the Common Areas, provided that, in connection therewith, Landlord shall perform such closures, alterations, additions

or changes in a commercially reasonable manner and, in connection therewith, shall use commercially reasonable efforts to minimize any material interference with Tenant's use of and access to the Premises.

1.2 **Stipulation of Rentable Square Feet of Premises**. For purposes of this Lease, "rentable square feet" of the Premises shall be deemed as set forth in Section 2.2 of the Summary. Notwithstanding the foregoing, the useable area of the Premises shall be determined in accordance with a standard promulgated by the Building Owners and Managers Association which standard is selected by Landlord. The rentable area of the Premises shall be determined by multiplying the useable area of the Premises by a "core factor". Landlord may, at any time, have its architect or engineer measure the actual total usable and rentable square footage of the Premises. In the event the Premises shall contain an amount of rentable square footage different than the amount of rentable square feet referenced in Section 2.2 of the Summary, the Premises shall be redefined to reflect the actual rentable square footage but the Base Rent and Additional Rent shall not change from/based what is listed in Section 4 of the Summary.

1.3 **Right of First Offer**. Beginning on the date which is six (6) months after the Rent Commencement Date Landlord hereby grants to the Tenant named in the Summary (the "**Original Tenant**") and its "Permitted Assignees", as defined in Section 14.8, below, a continuing right of first offer with respect to **Suite 012 containing approximately 12,128 rentable square feet** located in the Building as set forth in **Exhibit A** attached hereto, (the "**First Offer Space**"). Notwithstanding the foregoing, such first offer right of Tenant shall commence only following the expiration or earlier termination of the initial lease (including renewals) of the First Offer Space, and such right of first offer shall be subordinate to all rights of which are set forth in leases of space in the Project as of the date hereof, including any renewal rights set forth in such leases, regardless of whether such renewal rights are executed strictly in accordance with their terms, or pursuant to a lease amendment or a new lease (collectively, the "**Superior Right Holders**") with respect to such First Offer Space. Tenant's right of first offer shall not be applicable during any Option Term. Tenant's right of first offer shall be on the terms and conditions set forth in this Section 1.3.

1.3.1 **Procedure for Offer**. If Landlord receives a bona fide offer from a third party for the First Offer Space, any portion of the First Offer Space or such larger space that includes the First Offer Space, Landlord shall notify Tenant (the "**First Offer Notice**"), provided that no Superior Right Holder wishes to lease such space. Pursuant to such First Offer Notice, Landlord shall offer to lease to Tenant the then available First Offer Space and any additional space noted within the First Offer Notice. The First Offer Notice shall describe the space so offered to Tenant (which the parties acknowledge may include a portion of the First Offer Space, only the First Offer Space, or the First Offer Space plus additional contiguous space the Landlord is offering for lease) and shall set forth the "First Offer Rent," as that term is defined in Section 1.3.3 below, and the other economic terms upon which Landlord is willing to lease such space to Tenant.

1.3.2 **Procedure for Acceptance**. If Tenant wishes to exercise Tenant's right of first offer with respect to the space described in the First Offer Notice, then within ten (10) business days of delivery of the First Offer Notice to Tenant, Tenant shall deliver notice to Landlord of Tenant's election to exercise its right of first offer with respect to the entire space described in the First Offer Notice on the terms contained in such notice. If Tenant does not so notify Landlord within the ten (10) business day period, then Landlord shall be free to lease the space described in the First Offer Notice to anyone to whom Landlord desires on any terms Landlord desires. Notwithstanding anything to the contrary contained herein, Tenant must elect to exercise its right of first offer, if at all, with respect to all of the space offered by Landlord to Tenant at any particular time, and Tenant may not elect to lease only a portion thereof.

1.3.3 **First Offer Space Rent**. The "Rent," as that term is defined in Section 4.1, below, payable by Tenant for the First Offer Space (the "**First Offer Rent**") shall be equal to the "Fair Rental Value", as defined in Section 2.2.2, below, as of the "First Offer Commencement Date," as that term is defined in Section 1.3.5, below.

1.3.4 **Construction In First Offer Space**. Tenant shall take the First Offer Space in its "as is" condition, subject to any improvement allowance granted as a component of the Fair Rental Value, and the construction of improvements in the First Offer Space shall comply with the terms of Article 8 of this Lease.

1.3.5 **Amendment to Lease**. If Tenant timely exercises Tenant's right to lease the First Offer Space as set forth herein, Landlord and Tenant shall promptly thereafter execute an amendment to this Lease for such First Offer Space upon the terms and conditions as set forth in the First Offer Notice and this Section 1.3. Tenant

shall commence payment of Rent for the First Offer Space, and the term of the First Offer Space shall commence upon the date of delivery of the First Offer Space to Tenant (the "**First Offer Commencement Date**") and terminate on the date set forth in the First Offer Notice.

1.3.6 **Termination of Right of First Offer**. The rights contained in this Section 1.3 shall be personal to the Original Tenant and its Permitted Assignees, and may only be exercised by the Original Tenant or a Permitted Assignee (and not any other assignee, sublessee or other transferee of the Original Tenant's interest in this Lease) if the Original Tenant occupies the majority of the Premises. Tenant shall not have the right to lease First Offer Space, as provided in this Section 1.3, if, as of the date of the attempted exercise of any right of first offer by Tenant, or as of the scheduled date of delivery of such First Offer Space to Tenant, Tenant is in default under this Lease, after the expiration of any applicable notice and cure period, or Tenant has previously been in default, after the expiration of any applicable notice and cure period, under this Lease more than twice.

2. LEASE TERM; OPTION TERM

2.1 **Lease Term**. The terms and provisions of this Lease shall be effective as of the date of this Lease. The term of this Lease (the "**Lease Term**") shall be as set forth in Section 3.1 of the Summary, shall commence on the date set forth in Section 3.2 of the Summary (the "**Lease Commencement Date**"), and shall terminate on the date set forth in Section 3.4 of the Summary (the "**Lease Expiration Date**") unless this Lease is sooner terminated as hereinafter provided. For purposes of this Lease, the term "**Lease Year**" shall mean each consecutive twelve (12) month period during the Lease Term. At any time during the Lease Term, Landlord may deliver to Tenant a notice in the form as set forth in **Exhibit B**, attached hereto, as a confirmation only of the information set forth therein, which Tenant shall execute and return to Landlord within ten (10) business days of receipt thereof.

2.2 **Option Term**.

2.2.1 **Option Right**. Landlord hereby grants to the originally named Tenant herein ("**Original Tenant**"), and its "Permitted Assignees", as that term is defined in Section 14.8, below, one (1) option to extend the Lease Term for a period of five (5) years (the "**Option Term**"), which option shall be irrevocably exercised only by written notice delivered by Tenant to Landlord not more than eighteen (18) months nor less than nine (9) months prior to the expiration of the initial Lease Term, provided that the following conditions **(**the "**Option Conditions**") are satisfied: (i) as of the date of delivery of such notice, Tenant is not in default under this Lease, after the expiration of any applicable notice and cure period; (ii) as of the end of the Lease Term, Tenant is not in default under this Lease, after the expiration of any applicable notice and cure period; (iii) Tenant has not previously been in default under this Lease, after the expiration of any applicable notice and cure period, more than twice; and (iv) the Lease then remains in full force and effect and Original Tenant or a Permitted Assignee occupies the majority of the Premises at the time the option to extend is exercised and as of the commencement of the Option Term. Landlord may, at Landlord's option, exercised in Landlord's sole and absolute discretion, waive any of the Option Conditions in which case the option, if otherwise properly exercised by Tenant, shall remain in full force and effect. Upon the proper exercise of such option to extend, and provided that Tenant satisfies all of the Option Conditions (except those, if any, which are waived by Landlord), the Lease Term, as it applies to the Premises, shall be extended for a period of five (5) years. The rights contained in this Section 2.2 shall be personal to Original Tenant and any Permitted Assignees, and may be exercised by Original Tenant or such Permitted Assignees (and not by any assignee, sublessee or other "Transferee," as that term is defined in Section 14.1 of this Lease, of Tenant's interest in this Lease).

2.2.2 **Option Rent**. The annual Rent payable by Tenant during the Option Term (the "**Option Rent**") shall be equal to the "Fair Rental Value," as that term is defined below, for the Premises as of the commencement date of the Option Term. The "**Fair Rental Value**," as used in this Lease, shall be equal to the annual rent per rentable square foot (including additional rent and considering any "base year" or "expense stop" applicable thereto), including all escalations, at which tenants (pursuant to leases consummated within the twelve (12) month period preceding the first day of the Option Term), are leasing non-sublease, non-encumbered, non-equity space which is not significantly greater or smaller in size than the subject space, for a comparable lease term, in an arm's length transaction, which comparable space is located in the "Comparable Buildings," as that term is defined in this Section 2.2.2, below (transactions satisfying the foregoing criteria shall be known as the "**Comparable Transactions**"), taking into consideration the following concessions (the "**Concessions**"): (a) rental abatement concessions, if any, being granted such tenants in connection with such comparable space; (b) tenant improvements

or allowances provided or to be provided for such comparable space, and taking into account the value, if any, of the existing improvements in the subject space, such value to be based upon the age, condition, design, quality of finishes and layout of the improvements and the extent to which the same can be utilized by a general office user other than Tenant; and (c) other reasonable monetary concessions being granted such tenants in connection with such comparable space; provided, however, that in calculating the Fair Rental Value, no consideration shall be given to (i) the fact that Landlord is or is not required to pay a real estate brokerage commission in connection with Tenant's exercise of its right to extend the Lease Term, or the fact that landlords are or are not paying real estate brokerage commissions in connection with such comparable space, and (ii) any period of rental abatement, if any, granted to tenants in comparable transactions in connection with the design, permitting and construction of tenant improvements in such comparable spaces. The Fair Rental Value shall additionally include a determination as to whether, and if so to what extent, Tenant must provide Landlord with financial security, such as a letter of credit or guaranty, for Tenant's Rent obligations in connection with Tenant's lease of the Premises during the Option Term. Such determination shall be made by reviewing the extent of financial security then generally being imposed in Comparable Transactions from tenants of comparable financial condition and credit history to the then existing financial condition and credit history of Tenant (with appropriate adjustments to account for differences in the then-existing financial condition of Tenant and such other tenants). The Concessions (A) shall be reflected in the effective rental rate (which effective rental rate shall take into consideration the total dollar value of such Concessions as amortized on a straight-line basis over the applicable term of the Comparable Transaction (in which case such Concessions evidenced in the effective rental rate shall not be granted to Tenant)) payable by Tenant, or (B) at Landlord's election, all such Concessions shall be granted to Tenant in kind. The term "**Comparable Buildings**" shall mean the Building and those other class A life sciences or class A office buildings which are comparable to the Building in terms of age (based upon the date of completion of construction or major renovation of to the building), quality of construction, level of services and amenities, size and appearance, and are located in Durham, North Carolina and the surrounding commercial area.

2.2.3 **Determination of Option Rent**. In the event Tenant timely and appropriately exercises an option to extend the Lease Term, Landlord shall notify Tenant of Landlord's determination of the Option Rent at least sixty (60) days before the Lease Expiration Date. If Tenant, on or before the date which is ten (10) business days following the date upon which Tenant receives Landlord's determination of the Option Rent, in good faith objects to Landlord's determination of the Option Rent, then Landlord and Tenant shall attempt to agree upon the Option Rent using their best good-faith efforts. If Landlord and Tenant fail to reach agreement within ten (10) business days following Tenant's objection to the Option Rent (the "**Outside Agreement Date**"), then each party shall make a separate determination of the Option Rent, as the case may be, within five (5) business days, and such determinations shall be submitted to arbitration in accordance with Sections 2.2.3.1 through 2.2.3.7, below. If Tenant fails to object to Landlord's determination of the Option Rent within the time period set forth herein, then Tenant shall be deemed to have objected to Landlord's determination of Option Rent.

2.2.3.1 Landlord and Tenant shall each appoint one arbitrator who shall be, at the option of the appointing party, a real estate broker or appraiser who shall have been active over the five (5) year period ending on the date of such appointment in the leasing or appraisal (not currently or formerly in the employ of Landlord or Tenant), as the case may be, of other class A life sciences buildings located in the Durham, North Carolina market area. The determination of the arbitrators shall be limited solely to the issue of whether Landlord's or Tenant's submitted Option Rent is the closest to the actual Option Rent, taking into account the requirements of Section 2.2.2 of this Lease, as determined by the arbitrators. Each such arbitrator shall be appointed within fifteen (15) days after the Outside Agreement Date. Landlord and Tenant may consult with their selected arbitrators prior to appointment and may select an arbitrator who is favorable to their respective positions. The arbitrators so selected by Landlord and Tenant shall be deemed "**Advocate Arbitrators**."

2.2.3.2 The two (2) Advocate Arbitrators so appointed shall be specifically required pursuant to an engagement letter within ten (10) business days of the date of the appointment of the last appointed Advocate Arbitrator to agree upon and appoint a third arbitrator ("**Neutral Arbitrator**") who shall be qualified under the same criteria set forth hereinabove for qualification of the two Advocate Arbitrators, except that neither the Landlord or Tenant or either parties' Advocate Arbitrator may, directly or indirectly, consult with the Neutral Arbitrator prior or subsequent to his or her appearance. The Neutral Arbitrator shall be retained via an engagement letter jointly prepared by Landlord's counsel and Tenant's counsel.

2.2.3.3 The three arbitrators shall, within thirty (30) days of the appointment of the Neutral Arbitrator, reach a decision as to whether the parties shall use Landlord's or Tenant's submitted Option Rent, and shall notify Landlord and Tenant thereof.

2.2.3.4 The decision of the majority of the three arbitrators shall be binding upon Landlord and Tenant.

2.2.3.5 If either Landlord or Tenant fails to appoint an Advocate Arbitrator within fifteen (15) days after the Outside Agreement Date, then either party may petition the presiding judge of the Superior Court of Durham County to appoint such Advocate Arbitrator subject to the criteria in Section 2.2.3.1 of this Lease, or if he or she refuses to act, either party may petition any judge having jurisdiction over the parties to appoint such Advocate Arbitrator.

2.2.3.6 If the two (2) Advocate Arbitrators fail to agree upon and appoint the Neutral Arbitrator, then either party may petition the presiding judge of the Superior Court of Durham County to appoint the Neutral Arbitrator, subject to criteria in Section 2.2.3.1 2 of this Lease, or if he or she refuses to act, either party may petition any judge having jurisdiction over the parties to appoint such arbitrator.

2.2.3.7 The cost of the arbitration shall be paid by Landlord and Tenant equally.

2.2.3.8 In the event that the Option Rent shall not have been determined pursuant to the terms hereof prior to the commencement of the Option Term, Tenant shall be required to pay the Option Rent initially provided by Landlord to Tenant, and upon the final determination of the Option Rent, the payments made by Tenant shall be reconciled with the actual amounts of Option Rent due, and the appropriate party shall make any corresponding payment to the other party.

3. BASE RENT

3.1 Beginning on the Rent Commencement Date, Tenant shall pay, without prior notice or demand, to Landlord or Landlord's agent at the management office of the Project, or, at Landlord's option, at such other place as Landlord may from time to time designate in advance and in writing, (i) by a check for currency which, at the time of payment, is legal tender for private or public debts in the United States of America, or (ii) if so elected by Tenant, by electronic funds transfer to the account of Landlord as provided to Tenant, base rent ("**Base Rent**") as set forth in Section 4 of the Summary, payable in equal monthly installments as set forth in Section 4 of the Summary in advance on or before the first day of each and every calendar month during the Lease Term, without any setoff or deduction whatsoever. The Base Rent for the first full month of the Lease Term shall be paid at the time of Tenant's execution of this Lease. If any Rent payment date (including the Rent Commencement Date) falls on a day of the month other than the first day of such month or if any payment of Rent is for a period which is shorter than one month, the Rent for any fractional month shall accrue on a daily basis for the period from the date such payment is due to the end of such calendar month or to the end of the Lease Term at a rate per day which is equal to 1/365 of the applicable annual Rent. All other payments or adjustments required to be made under the terms of this Lease that require proration on a time basis shall be prorated on the same basis. Base Rent and Additional Rent, as defined below, shall together be denominated "**Rent**." Without limiting the foregoing, Tenant's obligation to pay Rent shall not be discharged or otherwise affected by any law or regulation now or hereafter applicable to the Premises, or any other restriction on Tenant's use, or (except as expressly provided herein) any casualty or taking, or any failure by Landlord to perform any covenant contained herein, or any other occurrence.

4. ADDITIONAL RENT

4.1 **General Terms**. In addition to paying the Base Rent specified in Article 3 of this Lease, Tenant shall pay "**Tenant's Share**" of the annual "**Direct Expenses**," as those terms are defined in Sections 4.2.6 and 4.2.2 of this Lease, respectively. Such payments by Tenant, together with any and all other amounts payable by Tenant to Landlord pursuant to the terms of this Lease, are hereinafter collectively referred to as the "**Additional Rent**". All amounts due under this Article 4 as Additional Rent shall be payable for the same periods and in the same manner as the Base Rent. Without limitation on other obligations of Tenant which survive the expiration of the Lease Term, the

obligations of Tenant to pay the Additional Rent provided for in this Article 4 shall survive the expiration of the Lease Term.

4.2 **Definitions of Key Terms Relating to Additional Rent**. As used in this Article 4, the following terms shall have the meanings hereinafter set forth:

4.2.1 Intentionally Omitted.

4.2.2 "**Direct Expenses**" shall mean "**Operating Expenses**" and "**Tax Expenses**."

4.2.3 "**Expense Year**" shall mean each calendar year in which any portion of the Lease Term falls, through and including the calendar year in which the Lease Term expires, provided that Landlord, upon advance written notice to Tenant, may change the Expense Year from time to time to any other twelve (12) consecutive month period, and, in the event of any such change, Tenant's Share of Direct Expenses shall be equitably adjusted for any Expense Year involved in any such change.

4.2.4 "**Operating Expenses**" shall mean all reasonable expenses, costs and amounts of every kind and nature which Landlord actually pays or accrues during any Expense Year because of or in connection with the ownership, management, maintenance, security, repair, replacement, restoration or operation of the Project, or any portion thereof. Without limiting the generality of the foregoing, Operating Expenses shall specifically include any and all of the following: (i) the cost of supplying all utilities, the cost of operating, repairing, maintaining, and renovating the utility, telephone, mechanical, sanitary, storm drainage, and elevator systems (if applicable), and the cost of maintenance and service contracts in connection therewith; (ii) the cost of licenses, certificates, permits and inspections and the cost of contesting any governmental enactments which affect Operating Expenses, and the costs incurred in connection with a governmentally mandated transportation system management program or similar program; (iii) the cost of all insurance carried by Landlord in connection with the Project as reasonably determined by Landlord; (iv) the cost of landscaping, re-lamping, and all supplies, tools, equipment and materials used in the operation, repair and maintenance of the Project, or any portion thereof; (v) the cost of parking area operation, repair, restoration, and maintenance; (vi) fees and other costs, including market management and/or incentive fees, consulting fees, legal fees and accounting fees, of all contractors and consultants in connection with the management, operation, maintenance and repair of the Project; (vii) payments under any equipment rental agreements and the fair rental value of any management office space; (viii) subject to item (f), below, wages, salaries and other compensation and benefits, including taxes levied thereon, of all persons engaged in the operation, maintenance and security of the Project (at or below the level of property manager); (ix) costs under any instrument pertaining to the sharing of costs by the Project; (x) operation, repair, maintenance and replacement of all systems and equipment and components thereof of the Project; (xi) the cost of janitorial, alarm, security and other services, replacement of wall and floor coverings, ceiling tiles and fixtures in Common Areas, maintenance and replacement of curbs and walkways, repair to roofs and re-roofing; (xii) amortization (including reasonable interest on the unamortized cost) over such period of time as Landlord shall reasonably determine, of the cost of acquiring or the rental expense of personal property used in the maintenance, operation and repair of the Project, or any portion thereof; (xiii) the cost of capital improvements or other costs incurred in connection with the Project (A) which are intended to reduce expenses in the operation or maintenance of the Project, or any portion thereof, or to reduce current or future Operating Expenses or to enhance the safety or security of the Project or its occupants, (B) that are required to comply with present or anticipated mandatory conservation programs, (C) which are replacements or modifications of nonstructural items located in the Common Areas required to keep the Common Areas in the same good order or condition as on the Commencement Date, or (D) that are required under any governmental law or regulation that was not in force or effect as of the Commencement Date; provided, however, that any capital expenditure shall be amortized (including reasonable interest on the amortized cost as reasonably determined by Landlord) in accordance with IRS regulations; and (xiv) costs, fees, charges or assessments imposed by, or resulting from any mandate imposed on Landlord by, any federal, state or local government for fire and police protection, trash removal, community services, or other services which do not constitute "Tax Expenses" as that term is defined in Section 4.2.5, below, (xv) cost of tenant relation programs reasonably established by Landlord, and (xvi) payments under any easement, license, operating agreement, declaration, restrictive covenant, or instrument pertaining to the sharing of costs by the Building, including, without limitation, any covenants, conditions and restrictions affecting the property, and reciprocal easement agreements affecting the property, any parking licenses, and any agreements with transit agencies affecting the Property (collectively, "**Underlying Documents**"). In the event that Landlord or Landlord's managers or agents perform services for the benefit of the Building off-site

which would otherwise be performed on-site (e.g. accounting), the cost of such services shall be reasonably allocated among the properties benefitting from such service and shall be included in Operating Expenses. Notwithstanding the foregoing, for purposes of this Lease, Operating Expenses shall not, however, include:

(a) costs, including legal fees, space planners' fees, advertising and promotional expenses, and brokerage fees incurred in connection with the original construction or development, or original or future leasing of the Project, and costs, including permit, license and inspection costs, incurred with respect to the installation of tenant improvements made for new tenants initially occupying space in the Project after the Lease Commencement Date or incurred in renovating or otherwise improving, decorating, painting or redecorating vacant space for tenants or other occupants of the Project (excluding, however, such costs relating to any common areas of the Project);

(b) except as set forth in items (xii), (xiii), and (xiv) above, depreciation, interest and principal payments on mortgages and other debt costs, if any, penalties and interest, and costs of capital improvements (as distinguished from repairs or replacements);

(c) costs for which the Landlord is reimbursed by any tenant or occupant of the Project or by insurance by its carrier or any tenant's carrier or by anyone else, and electric power costs for which any tenant directly contracts with the local public service company;

(d) any bad debt loss, rent loss, or reserves for bad debts or rent loss;

(e) costs associated with the operation of the business of the partnership or entity which constitutes the Landlord, as the same are distinguished from the costs of operation of the Project (which shall specifically include, but not be limited to, accounting costs associated with the operation of the Project). Costs associated with the operation of the business of the partnership or entity which constitutes the Landlord include costs of partnership accounting and legal matters, costs of defending any lawsuits with any mortgagee (except as the actions of the Tenant may be in issue), costs of selling, syndicating, financing, mortgaging or hypothecating any of the Landlord's interest in the Project, and costs incurred in connection with any disputes between Landlord and its employees, between Landlord and Project management, or between Landlord and other tenants or occupants;

(f) the wages and benefits of any employee who does not devote substantially all of his or her employed time to the Project unless such wages and benefits are prorated to reflect time spent on operating and managing the Project vis-a-vis time spent on matters unrelated to operating and managing the Project; provided, that in no event shall Operating Expenses for purposes of this Lease include wages and/or benefits attributable to personnel above the level of Project manager;

(g) amount paid as ground rental for the Project by the Landlord;

(h) except for a property management fee to the extent expressly allowed above, overhead and profit increment paid to the Landlord or to subsidiaries or affiliates of the Landlord for services in the Project to the extent the same exceeds the costs of such services rendered by qualified, first-class unaffiliated third parties on a competitive basis;

(i) any compensation paid to clerks, attendants or other persons in commercial concessions operated by the Landlord, provided that any compensation paid to any concierge at the Project shall be includable as an Operating Expense;

(j) rentals and other related expenses incurred in leasing air conditioning systems, elevators (if applicable) or other equipment which if purchased the cost of which would be excluded from Operating Expenses as a capital improvement, except equipment not affixed to the Project which is used in providing janitorial or similar services and, further excepting from this exclusion such equipment rented or leased to remedy or ameliorate an emergency condition in the Project ;

(k) all items and services for which Tenant or any other tenant in the Project reimburses Landlord or which Landlord provides selectively to one or more tenants (other than Tenant) without reimbursement;

(l) any costs expressly excluded from Operating Expenses elsewhere in this Lease;

(m) rent for any office space occupied by Project management personnel to the extent the size or rental rate of such office space exceeds the size or fair market rental value of office space occupied by management personnel of the comparable buildings in the vicinity of the Building, with adjustment where appropriate for the size of the applicable project;

(n) costs arising from the gross negligence or willful misconduct of Landlord or its agents, employees, vendors, contractors, or providers of materials or services;

(o) costs incurred to comply with laws relating to the removal of hazardous material (as defined under Applicable Law) which was in existence in the Building or on the Project prior to the Lease Commencement Date, and was of such a nature that a federal, State or municipal governmental authority, if it had then had knowledge of the presence of such hazardous material, in the state, and under the conditions that it then existed in the Building or on the Project, would have then required the removal of such hazardous material or other remedial or containment action with respect thereto; and costs incurred to remove, remedy, contain, or treat hazardous material, which hazardous material is brought into the Building or onto the Project after the date hereof by Landlord or any other tenant of the Project and is of such a nature, at that time, that a federal, State or municipal governmental authority, if it had then had knowledge of the presence of such hazardous material, in the state, and under the conditions, that it then exists in the Building or on the Project, would have then required the removal of such hazardous material or other remedial or containment action with respect thereto;

(p) costs incurred to comply with laws relating to the removal of Hazardous Materials (other than Hazardous Materials typically found in first class office buildings, such as recyclable materials and typical construction materials, and costs to comply with the Operation and Maintenance Plan described on **Exhibit G**);

(q) the cost of special services, goods or materials provided to any other tenant of the Project free of charge, and not provided to Tenant;

(r) Landlord’s general overhead expenses not related to the Project;

(s) legal fees, accountants’ fees (other than normal bookkeeping expenses) and other expenses incurred in connection with disputes of tenants or other occupants of the Project or associated with the enforcement of the terms of any leases with tenants or the defense of Landlord’s title to or interest in the Project or any part thereof;

(t) costs incurred due to a violation by Landlord or any other tenant of the Project of the terms and conditions of a lease; and

(u) any reserve funds.

If Landlord is not furnishing any particular work or service (the cost of which, if performed by Landlord, would be included in Operating Expenses) to a tenant who has undertaken to perform such work or service in lieu of the performance thereof by Landlord, Operating Expenses shall be deemed to be increased by an amount equal to the additional Operating Expenses which would reasonably have been incurred during such period by Landlord if it had at its own expense furnished such work or service to such tenant. If the Project is not at least one hundred percent (100%) occupied during all or a portion of any Expense Year, Landlord shall make an appropriate adjustment to the components of Operating Expenses for such year to determine the amount of Operating Expenses that would have been incurred had the Project been one hundred percent (100%) occupied; and the amount so determined shall be deemed to have been the amount of Operating Expenses for such year.

4.2.5 **Taxes**.

4.2.5.1 "**Tax Expenses**" shall mean all federal, state, county, or local governmental or municipal taxes, fees, charges or other impositions of every kind and nature, whether general, special, ordinary or extraordinary (including, without limitation, real estate taxes, general and special assessments, transit taxes, leasehold taxes or taxes based upon the receipt of rent, including gross receipts or sales taxes applicable to the receipt of rent, unless required to be paid by Tenant, personal property taxes imposed upon the fixtures, machinery, equipment, apparatus, systems and equipment, appurtenances, furniture and other personal property used in connection with the Project, or any portion thereof), which shall be paid or accrued during any Expense Year (without regard to any different fiscal year used by such governmental or municipal authority) because of or in connection with the ownership, leasing and operation of the Project, or any portion thereof.

4.2.5.2 Tax Expenses shall include, without limitation: (i) Any tax on the rent, right to rent or other income from the Project, or any portion thereof, or as against the business of leasing the Project, or any portion thereof; (ii) Any assessment, tax, fee, levy or charge in addition to, or in substitution, partially or totally, of any assessment, tax, fee, levy or charge previously included within the definition of real property tax; (iii) Any assessment, tax, fee, levy, or charge allocable to or measured by the area of the Premises or the Rent payable hereunder, including, without limitation, any business or gross income tax or excise tax with respect to the receipt of such rent, or upon or with respect to the possession, leasing, operating, management, maintenance, alteration, repair, use or occupancy by Tenant of the Premises, or any portion thereof; and (iv) Any assessment, tax, fee, levy or charge, upon this transaction or any document to which Tenant is a party, creating or transferring an interest or an estate in the Premises or the improvements thereon.

4.2.5.3 Any reasonable costs and expenses (including, without limitation, reasonable attorneys' and consultants' fees) incurred in attempting to protest, reduce or minimize Tax Expenses shall be included in Tax Expenses in the Expense Year such expenses are incurred. Tax refunds shall be credited against Tax Expenses and refunded to Tenant regardless of when received, based on the Expense Year to which the refund is applicable, provided that in no event shall the amount to be refunded to Tenant for any such Expense Year exceed the total amount paid by Tenant as Additional Rent under this Article 4 for such Expense Year. The foregoing sentence shall survive the expiration or earlier termination of this Lease. If Tax Expenses for any period during the Lease Term or any extension thereof are increased after payment thereof for any reason, including, without limitation, error or reassessment by applicable governmental or municipal authorities, Tenant shall pay Landlord upon demand Tenant's Share of any such increased Tax Expenses. Notwithstanding anything to the contrary contained in this Section 4.2.5, there shall be excluded from Tax Expenses (i) all excess profits taxes, franchise taxes, gift taxes, capital stock taxes, inheritance and succession taxes, estate taxes, transfer tax or fee, federal and state income taxes, and other taxes to the extent applicable to Landlord's general or net income (as opposed to rents, receipts or income attributable to operations at the Project), (ii) any items included as Operating Expenses, and (iii) any items paid by Tenant under Section 4.5 of this Lease.

4.2.6 "**Tenant's Share**" is based upon the ratio that the rentable square feet of the Premises bears to the rentable square feet of the Building and, subject to adjustment pursuant to Section 1.2 above, is the percentage set forth in Section 7 of the Summary.

4.3 **Intentionally omitted**. .

4.4 **Calculation and Payment of Additional Rent**. Tenant shall pay to Landlord, in the manner set forth in Section 4.4.1, below, and as Additional Rent, Tenant's Share of Direct Expenses for each Expense Year. If the Rent Commencement Date is a day other than the first day of an Expense Year, or if this Lease terminates or expires on a day other than the last day of an Expense Year, then Additional Rent shall be prorated in the manner provided in Section 3.1 above.

4.4.1 **Statement of Actual Direct Expenses and Payment by Tenant**. Landlord shall use good faith efforts to give to Tenant within six (6) months following the end of each Expense Year, a statement (the "**Statement**") which shall state the Direct Expenses incurred or accrued for such preceding Expense Year, and which shall indicate the amount of Tenant's Share of Direct Expenses. Upon receipt of the Statement for each Expense Year commencing or ending during the Lease Term, Tenant shall pay, with its next installment of Base Rent due, the full

amount of Tenant's Share of Direct Expenses for such Expense Year, less the amounts, if any, paid during such Expense Year as "**Estimated Direct Expenses**," as that term is defined in Section 4.4.2, below, and if Tenant paid more as Estimated Direct Expenses than the actual Tenant's Share of Direct Expenses, Tenant shall receive a credit in the amount of Tenant's overpayment against Rent next due under this Lease. The failure of Landlord to timely furnish the Statement for any Expense Year shall not prejudice Landlord or Tenant from enforcing its rights under this Article 4. Even though the Lease Term has expired and Tenant has vacated the Premises, when the final determination is made of Tenant's Share of Direct Expenses for the Expense Year in which this Lease terminates, Tenant shall pay to Landlord such amount within thirty (30) days, and if Tenant paid more as Estimated Direct Expenses than the actual Tenant's Share of Direct Expenses, Landlord shall, within thirty (30) days, deliver a check payable to Tenant in the amount of the overpayment. The provisions of this Section 4.4.1 shall survive the expiration or earlier termination of the Lease Term. Notwithstanding the immediately preceding sentence, Tenant shall not be responsible for Tenant's Share of any Direct Expenses attributable to any Expense Year which are first billed to Tenant more than two (2) calendar years after the earlier of the expiration of the applicable Expense Year or the Lease Expiration Date, provided that in any event Tenant shall be responsible for Tenant's Share of Direct Expenses levied by any governmental authority or by any public utility companies at any time following the Lease Expiration Date which are attributable to any Expense Year (provided that Landlord delivers Tenant a bill for such amounts within two (2) years following Landlord's receipt of the bill therefor).

4.4.2 **Statement of Estimated Direct Expenses**. In addition, Landlord shall give Tenant a yearly expense estimate statement (the "**Estimate Statement**") which shall set forth Landlord's reasonable estimate (the "**Estimate**") of what the total amount of Direct Expenses for the then-current Expense Year shall be and the estimated Tenant's Share of Direct Expenses (the "**Estimated Direct Expenses**"). The failure of Landlord to timely furnish the Estimate Statement for any Expense Year shall not preclude Landlord from enforcing its rights to collect any Estimated Direct Expenses under this Article 4, nor shall Landlord be prohibited from revising any Estimate Statement or Estimated Direct Expenses theretofore delivered to the extent necessary. Thereafter, Tenant shall pay, with its next installment of Base Rent due, a fraction of the Estimated Direct Expenses for the then-current Expense Year (reduced by any amounts paid pursuant to the last sentence of this Section 4.4.2). Such fraction shall have as its numerator the number of months which have elapsed in such current Expense Year, including the month of such payment, and twelve (12) as its denominator. Until a new Estimate Statement is furnished (which Landlord shall have the right to deliver to Tenant at any time), Tenant shall pay monthly, with the monthly Base Rent installments, an amount equal to one-twelfth (1/12) of the total Estimated Direct Expenses set forth in the previous Estimate Statement delivered by Landlord to Tenant.

4.4.3 **Audit Right**. In the event the Controllable Operating Expenses (as defined below) increase by more than three percent (3%) in any given Lease Year (as measured against the Controllable Operating Expenses for the immediately preceding Lease Year), or as otherwise reasonably requested by Tenant (or required by Tenant's business partners and/or applicable law), then Tenant may audit Landlord's records and all information pertaining to Operating Expenses in order to verify the accuracy of Landlord's determination of the Tenant's Share subject to the procedure noted below. Controllable Operating Expenses shall include all Operating Expenses other than utilities (e.g., electricity, gas, water and sewer), management fees, security expenses, insurance, taxes, assessments, snow and ice removal and other weather related charges, association fees and charges under any declaration, storm water fees and similar governmental or quasi-governmentally imposed fees, and any other expenses which are set or determined by a governmental entity or other third party and non-negotiable, or are otherwise beyond Landlord's reasonable control including minimum wage increases, hereafter, "**Controllable Operating Expenses**". Tenant must comply with the following in order to audit Landlord's records and information pertaining to Operating Expenses:

(i) Tenant must give notice to Landlord of its election to undertake said audit within one hundred twenty (120) days after receipt of the statement of the actual amount of Tenant's Share for the preceding calendar year from Landlord, and with respect to such audit, Tenant may audit the two preceding calendar years;

(ii) Such audit will be conducted only during regular business hours at the office where Landlord maintains records of Operating Expenses and only after Tenant gives Landlord fourteen (14) days' advance written notice;

(iii) Tenant shall deliver to Landlord a copy of the results of such audit within fifteen (15) days of its receipt by Tenant and no such audit shall be conducted if any other tenant of the Building has conducted an independent audit for the time period Tenant intends to audit and Landlord furnishes to Tenant a copy of such audit;

(iv) No audit shall be conducted at any time that Tenant is in default (after the expiration of any applicable grace and/or cure period) of any of the terms of this Lease;

(v) No subtenant shall have any right to conduct an audit and no assignee shall conduct an audit for any period during which such assignee was not in possession of the Premises;

(vi) Such audit review by Tenant shall not postpone or alter the liability and obligation of Tenant to pay any amounts due under the terms of this Lease; and

(vii) Such audit shall be conducted by an independent, reputable accounting firm which is not being compensated by Tenant on a contingency fee basis.

Within thirty (30) days after Tenant's receipt of such audit, Tenant must give notice to Landlord of any disputed amounts and identify all items being contested in Landlord's statement of the Tenant Share. If Landlord and Tenant cannot agree upon any such item as to which Tenant shall have given such notice, the dispute shall be resolved by an audit by a major accounting firm mutually and reasonably acceptable to Landlord and Tenant and the cost of said joint audit shall be paid by the non-prevailing party.

Any adjustment required as a result of any audit shall be paid within 30 days, or adjusted in the next installment(s) of Tenant's Share.

4.5 **Taxes and Other Charges for Which Tenant Is Directly Responsible**. Tenant shall be liable for and shall pay before delinquency, taxes levied against Tenant's equipment, furniture, fixtures and any other personal property located in or about the Premises. If any such taxes on Tenant's equipment, furniture, fixtures and any other personal property are levied against Landlord or Landlord's property or if the assessed value of Landlord's property is noticeably increased by the inclusion therein of a value placed upon such equipment, furniture, fixtures or any other personal property (as reasonably documented by Landlord) and if Landlord pays the taxes based upon such increased assessment, which Landlord shall have the right to do regardless of the validity thereof but only under proper protest if requested by Tenant, Tenant shall upon demand repay to Landlord the taxes so levied against Landlord or the proportion of such taxes resulting from such increase in the assessment, as the case may be.

4.6 **Limit of Increases in Tenant's Share of Operating Expenses.** The Controllable Operating Expenses (as hereinafter defined) which may be passed through to Tenant under this Section 4 shall not increase in any year by an amount which exceeds five percent (5%) of such Controllable Operating Expenses for the immediately preceding year (as measured on a cumulative and compounded basis). For purposes hereof, "**Controllable Operating Expenses**" shall be deemed to include all Operating Expenses other than utilities (e.g., electricity, gas, water and sewer), management fees, security expenses, insurance, taxes, assessments, snow and ice removal and other weather related charges, association fees and charges under any declaration, storm water fees and similar governmental or quasi-governmentally imposed fees, and any other expenses which are set or determined by a governmental entity or other third party or are otherwise beyond Landlord's reasonable control including minimum wage increases.

5. USE OF PREMISES

5.1 **Permitted Use**. Tenant shall use the Premises solely for the Permitted Use set forth in Section 8 of the Summary and Tenant shall not use the Premises or the Project for any other purpose or purposes whatsoever without the prior written consent of Landlord, which may be withheld in Landlord's sole discretion.

5.2 **Prohibited Uses**. Tenant further covenants and agrees that Tenant shall not use, or suffer or permit any person or persons to use, the Premises or any part thereof for any use or purpose contrary to the provisions of the

Rules and Regulations set forth in **Exhibit E**, attached hereto (the "**Rules and Regulations**"), or in violation of the laws of the United States of America, the State of North Carolina, or the ordinances, regulations or requirements of the local municipal or county governing body or other lawful authorities having jurisdiction over the Project, including, without limitation, any such laws, ordinances, regulations or requirements relating to hazardous materials or substances, as those terms are defined by Applicable Laws now or hereafter in effect, or any Underlying Documents. Tenant shall not do or permit anything to be done in or about the Premises which will damage the reputation of the Project or obstruct or unreasonably interfere with the rights of other tenants or occupants of the Building, or injure or annoy them or use or allow the Premises to be used for any improper, unlawful or objectionable purpose, nor shall Tenant cause or maintain any nuisance in, on or about the Premises. Tenant shall comply with, and Tenant's rights and obligations under the Lease and Tenant's use of the Premises shall be subject and subordinate to, all recorded easements, covenants, conditions, and restrictions now or hereafter affecting the Project. Provided, however, that (a) in the event of any conflict between any Rules and Regulations and the express terms of this Lease, the Lease terms shall control; (b) such Rules and Regulations do not require payment of additional material sum of money; (c) such Rules and Regulations do not unreasonably and materially interfere with Tenant's conduct of its business or Tenant's use and enjoyment of the Premises; (d) Landlord provides reasonable advance written notice thereof; and (e) such Rules and Regulations are uniformly enforced in a non-discriminatory manner.

5.3 **Intentionally Omitted**.

5.4 **Hazardous Materials**.

5.4.1 **Tenant's Obligations**.

5.4.1.1 **Prohibitions**. As a material inducement to Landlord to enter into this Lease with Tenant, Tenant has, to the best of its knowledge, completed Landlord's Pre-Leasing Environmental Exposure Questionnaire (the "**Environmental Questionnaire**"), which is attached as **Exhibit G**. Tenant hereby represents, warrants and covenants that except for those chemicals or materials, and their respective quantities, specifically listed on the Environmental Questionnaire, neither Tenant nor Tenant's employees, contractors and subcontractors of any tier, entities with a contractual relationship with Tenant (other than Landlord), or any entity acting as an agent or sub-agent of Tenant (collectively, "**Tenant's Agents**") will produce, use, store or generate any "Hazardous Materials," as that term is defined below, on, under or about the Premises, nor cause or permit any Hazardous Material to be brought upon, placed, stored, manufactured, generated, blended, handled, recycled, used or "Released," as that term is defined below, on, in, under or about the Premises. If any information provided to Landlord by Tenant on the Environmental Questionnaire, or otherwise relating to information concerning Hazardous Materials is knowingly false, incomplete, or misleading in any material respect, the same shall be deemed a default by Tenant under this Lease. Tenant shall deliver to Landlord an updated Environmental Questionnaire at least once a year, upon Landlord's request, and in the event of any material change in Tenant's use of Hazardous Materials at the Premises. Landlord's prior written consent shall be required to any Hazardous Materials use for the Premises not described on the initial Environmental Questionnaire, such consent not to be unreasonably withheld, conditioned, or delayed. Tenant shall not install or permit any underground storage tank on the Premises. In addition, Tenant agrees that it: (i) shall not cause or suffer to occur, the Release of any Hazardous Materials at, upon, under or within the Premises or any contiguous or adjacent premises; and (ii) shall not engage in activities at the Premises that result in, give rise to, or lead to the imposition of liability upon Tenant or Landlord or the creation of an environmental lien or use restriction upon the Premises. For purposes of this Lease, "**Hazardous Materials**" means all flammable explosives, petroleum and petroleum products, waste oil, radon, radioactive materials, toxic pollutants, asbestos, polychlorinated biphenyls ("**PCBs**"), medical waste, chemicals known to cause cancer or reproductive toxicity, pollutants, contaminants, hazardous wastes, toxic substances or related materials, including without limitation any chemical, element, compound, mixture, solution, substance, object, waste or any combination thereof, which is or may be hazardous to human health, safety or to the environment due to its radioactivity, ignitability, corrosiveness, reactivity, explosiveness, toxicity, carcinogenicity, infectiousness or other harmful or potentially harmful properties or effects, or defined as, regulated as or included in, the definition of "hazardous substances," "hazardous wastes," "hazardous materials," or "toxic substances" under any Environmental Laws. The term "Hazardous Materials" for purposes of this Lease shall also include any mold, fungus or spores, whether or not the same is defined, listed, or otherwise classified as a "hazardous material" under any Environmental Laws, if such mold, fungus or spores may pose a risk to human health or the environment or negatively impact the value of the Premises. For purposes of this Lease, "**Release**" or "**Released**" or "**Releases**" shall mean any release, deposit, discharge, emission, leaking, spilling, seeping, migrating, injecting, pumping, pouring, emptying, escaping, dumping, disposing, or other movement of Hazardous Materials into the environment.

Any use or storage of Hazardous Materials by Tenant permitted pursuant to this Article 5 shall not exceed Tenant's proportionate share (measured on a per floor basis), based on the standards of the BMBL (as defined below), of similarly classed Hazardous Materials. Notwithstanding the foregoing to the contrary, in no event shall Tenant or anyone claiming by through or under Tenant perform work at or above the risk category Biosafety Level 2 as established by the Department of Health and Human Services ("**DHHS**") and as further described in the DHHS publication Biosafety in Microbiological and Biomedical Laboratories (5th Edition) (as it may be or may have been further revised, the "**BMBL**") or such nationally recognized new or replacement standards as Landlord may reasonable designate). Tenant shall comply with all applicable provisions of the standards of the BMBL to the extent applicable to Tenant's operations in the Premises.

5.4.1.2 **Intentionally Omitted.**

5.4.1.3 **Notices to Landlord**. Unless Tenant is required by Applicable Laws to give earlier notice to Landlord, Tenant shall notify Landlord in writing as soon as reasonably possible but in no event later than five (5) days after knowledge of (i) the occurrence of any actual, alleged or threatened Release of any Hazardous Material in, on, under, from, about or in the vicinity of the Premises (whether past or present), regardless of the source or quantity of any such Release, or (ii) Tenant becomes aware of any regulatory actions, inquiries, inspections, investigations, directives, or any cleanup, compliance, enforcement or abatement proceedings (including any threatened or contemplated investigations or proceedings) relating to or potentially affecting the Premises, or (iii) Tenant becomes aware of any claims by any person or entity relating to any Hazardous Materials in, on, under, from, about or in the vicinity of the Premises, whether relating to damage, contribution, cost recovery, compensation, loss or injury. Collectively, the matters set forth in clauses (i), (ii) and (iii) above are hereinafter referred to as "Hazardous Materials Claims". Tenant shall promptly forward to Landlord copies of all orders, notices, permits, applications and other communications and reports in connection with any Hazardous Materials Claims. Additionally, Tenant shall promptly advise Landlord in writing of Tenant's discovery of any occurrence or condition on, in, under or about the Premises that could subject Tenant or Landlord to any liability, or restrictions on ownership, occupancy, transferability or use of the Premises under any "Environmental Laws," as that term is defined below. Tenant shall not enter into any legal proceeding or other action, settlement, consent decree or other compromise with respect to any Hazardous Materials Claims without first notifying Landlord of Tenant's intention to do so and affording Landlord the opportunity to join and participate, as a party if Landlord so elects, in such proceedings and in no event shall Tenant enter into any agreements which are binding on Landlord or the Premises without Landlord's prior written consent. Landlord shall have the right to appear at and participate in, any and all legal or other administrative proceedings concerning any Hazardous Materials Claim. For purposes of this Lease, "Environmental Laws" means all applicable present and future laws, including principles of common law, relating to the protection of human health, safety, wildlife or the environment, including, without limitation, (i) all requirements pertaining to reporting, licensing, permitting, investigation and/or remediation of emissions, discharges, Releases, or threatened Releases of Hazardous Materials, whether solid, liquid, or gaseous in nature, into the air, surface water, groundwater, or land, or relating to the manufacture, processing, distribution, use, treatment, storage, disposal, transport, or handling of Hazardous Materials; and (ii) all requirements pertaining to the health and safety of employees or the public. Environmental Laws include, but are not limited to, the Comprehensive Environmental Response, Compensation and Liability Act of 1980, 42 USC § 9601, et seq., the Hazardous Materials Transportation Authorization Act of 1994, 49 USC § 5101, et seq., the Solid Waste Disposal Act, as amended by the Resource Conservation and Recovery Act of 1976, and Hazardous and Solid Waste Amendments of 1984, 42 USC § 6901, et seq., the Federal Water Pollution Control Act, as amended by the Clean Water Act of 1977, 33 USC § 1251, et seq., the Clean Air Act of 1966, 42 USC § 7401, et seq., the Toxic Substances Control Act of 1976, 15 USC § 2601, et seq., the Safe Drinking Water Act of 1974, 42 USC §§ 300f through 300j, the Occupational Safety and Health Act of 1970, as amended, 29 USC § 651 et seq., the Oil Pollution Act of 1990, 33 USC § 2701 et seq., the Emergency Planning and Community Right-To-Know Act of 1986, 42 USC § 11001 et seq., the National Environmental Policy Act of 1969, 42 USC § 4321 et seq., the Federal Insecticide, Fungicide and Rodenticide Act of 1947, 7 USC § 136 et seq., North Carolina Oil Pollution and Hazardous Substances Control Act, N.C. Gen. Stat. § 143-215.75 et seq., North Carolina Inactive Hazardous Sites Act, N.C. Gen. Stat. § 130A-310, North Carolina Water and Air Resources Act, N.C. Gen. Stat. § 143-211 et seq., 15A N.C. Admin. Code Subchapter 2L, , and any other state or local law counterparts, as amended, as such Applicable Laws, are in effect as of the Lease Commencement Date, or thereafter adopted, published, or promulgated.

5.4.1.4 **Releases of Hazardous Materials**. If any Release of any Hazardous Material in, on, under, from or about the Premises shall occur at any time during the Lease and/or if any other Hazardous Material condition exists at the Premises proximately due to the breach of Tenant's obligations under this Section 5.4 that requires response actions under Environmental Laws, in addition to notifying Landlord as specified above, Tenant, at its own sole cost and expense, shall (i) immediately comply with any and all reporting requirements imposed pursuant to any and all Environmental Laws, (ii) provide a written certification to Landlord indicating that Tenant has complied with all applicable reporting requirements, (iii) take any and all necessary investigation, corrective and remedial action in accordance with any and all applicable Environmental Laws, utilizing an environmental consultant reasonably approved by Landlord, all in accordance with the provisions and requirements of this Section 5.4, including, without limitation, Section 5.4.4, and (iv) take any such additional investigative, remedial and corrective actions as Landlord shall in its reasonable discretion deem necessary such that the Premises are remediated to a condition allowing unrestricted use of the Premises (i.e. to a level that will allow any future use of the Premises, including residential, without any engineering controls or deed restrictions), all in accordance with the provisions and requirements of this Section 5.4. Landlord may, as required by any and all Environmental Laws, report the Release of any Hazardous Material to the appropriate governmental authority, identifying Tenant as the responsible party. Tenant shall deliver to Landlord copies of all administrative orders, notices, demands, directives or other communications directed to Tenant from any governmental authority with respect to any Release of Hazardous Materials in, on, under, from, or about the Premises, together with copies of all investigation, assessment, and remediation plans and reports prepared by or on behalf of Tenant in response to any such regulatory order or directive. Notwithstanding the foregoing, if Tenant provides Landlord with substantial proof that a Release in the Premises was caused by another tenant or occupant in the Project then Landlord shall use good faith efforts to assist Tenant in pursuing such party to cause it to remediate the Release or pay for such remediation, but ultimately Tenant's obligations under this Section 5.4 shall remain as stated herein.

5.4.1.5 **Indemnification**.

5.4.1.5.1 **In General**. Without limiting in any way Tenant's obligations under any other provision of this Lease, Tenant shall be solely responsible for and shall protect, defend, indemnify and hold the Landlord Parties harmless from and against any and all claims, judgments, losses, damages, costs, expenses, penalties, enforcement actions, taxes, fines, remedial actions, liabilities (including, without limitation, actual attorneys' fees, litigation, arbitration and administrative proceeding costs, expert and consultant fees and laboratory costs) including, without limitation, consequential damages and sums paid in settlement of claims, which arise during or after the Lease Term, whether foreseeable or unforeseeable, directly or indirectly arising out of or attributable to the presence, use, generation, manufacture, treatment, handling, refining, production, processing, storage, Release or presence of Hazardous Materials in, on, under or about the Premises by Tenant, except to the extent such liabilities result from the gross negligence or willful misconduct of Landlord following the Lease Commencement Date. The foregoing obligations of Tenant shall include, including without limitation: (i) the costs of any required or necessary removal, repair, cleanup or remediation of the Premises, and the preparation and implementation of any closure, removal, remedial or other required plans; (ii) judgments for personal injury or property damages; and (iii) all costs and expenses incurred by Landlord in connection therewith. It is the express intention of the parties to this Lease that Tenant assumes all such liabilities, and holds Landlord harmless from all such liabilities, associated with the environmental condition of the Premises, arising on or after the date Tenant takes possession of the Premises.

5.4.1.5.2 **Limitations**. Landlord warrants and represents that Landlord has not engaged in the Release of any Hazardous Materials subsequent to the date of the "Phase I Environmental Site Assessment Report" bearing ECS Project No. 49-1782, prepared on behalf of Longfellow Real Estate Ventures, LLC as of April 18, 2016 ("ECS Phase I") Landlord further warrants and represents that, to Landlord's knowledge, on or after the effective date of the ECS Phase I report, Landlord has not received a summons, citation, directive, letter or other communication, written or oral, from any state agency or the U.S. Government concerning the Project or any intentional or unintentional action on Landlord or any occupant's part as a result of a Release of any Hazardous Materials.

5.4.1.6 **Compliance with Environmental Laws**. Without limiting the generality of Tenant's obligation to comply with Applicable Laws as otherwise provided in this Lease, Tenant shall, at its sole cost and expense, comply with all Environmental Laws. Tenant shall obtain and maintain any and all necessary permits, licenses, certifications and approvals appropriate or required for the use, handling, storage, and disposal of any

Hazardous Materials used, stored, generated, transported, handled, blended, or recycled by Tenant on the Premises. Landlord shall have a continuing right, without obligation, to require Tenant to obtain, and to review and inspect any and all such permits, licenses, certifications and approvals, together with copies of any and all Hazardous Materials management plans and programs, any and all Hazardous Materials risk management and pollution prevention programs, and any and all Hazardous Materials emergency response and employee training programs respecting Tenant's use of Hazardous Materials. Upon request of Landlord, Tenant shall deliver to Landlord a narrative description explaining the nature and scope of Tenant's activities involving Hazardous Materials and showing to Landlord's satisfaction compliance with all Environmental Laws and the terms of this Lease.

5.4.2 **Assurance of Performance**.

5.4.2.1 **Environmental Assessments In General**. Landlord may, but shall not be required to, engage from time to time such contractors as Landlord determines to be appropriate (and with reasonable advance notice to Tenant, not less than 5 business days) to perform "Environmental Assessments," as that term is defined below, to ensure Tenant's compliance with the requirements of this Lease with respect to Hazardous Materials. For purposes of this Lease, "**Environmental Assessment**" means an assessment including, without limitation: (i) an environmental site assessment conducted in accordance with the then-current standards of the American Society for Testing and Materials and meeting the requirements for satisfying the "all appropriate inquiries" requirements; and (ii) sampling and testing of the Premises based upon potential recognized environmental conditions or areas of concern or inquiry identified by the environmental site assessment.

5.4.2.2 **Costs of Environmental Assessments**. All costs and expenses incurred by Landlord in connection with any such Environmental Assessment initially shall be paid by Landlord; provided that if any such Environmental Assessment shows that Tenant has failed to comply with the provisions of this Section 5.4, then all of the costs and expenses of such Environmental Assessment shall be reimbursed by Tenant as Additional Rent within thirty (30) days after receipt of written demand therefor (and reasonable documentation of Tenant's material breach of its environmental obligations).

5.4.3 **Tenant's Obligations upon Surrender**. At the expiration or earlier termination of the Lease Term, Tenant, at Tenant's sole cost and expense, shall: (i) cause an Environmental Assessment of the Premises to be conducted in accordance with Section 15.3; (ii) cause all Hazardous Materials to be removed from the Premises and disposed of in accordance with all Environmental Laws and as necessary to allow the Premises to be used for any purpose; and (iii) cause to be removed all containers installed or used by Tenant or Tenant's Agents to store any Hazardous Materials on the Premises, and cause to be repaired any damage to the Premises caused by such removal.

5.4.4 **Clean-up**.

5.4.4.1 **Environmental Reports; Clean-Up**. If any written report, including any report containing results of any Environmental Assessment (an "**Environmental Report**") shall indicate (i) the presence of any Hazardous Materials as to which Tenant has a removal or remediation obligation under this Section 5.4, and (ii) that as a result of same, the investigation, characterization, monitoring, assessment, repair, closure, remediation, removal, or other clean-up (the "**Clean-up**") of any Hazardous Materials is required, Tenant shall promptly prepare and submit to Landlord within thirty (30) days after receipt of the Environmental Report a comprehensive plan, subject to Landlord's written approval, specifying the actions to be taken by Tenant to perform the Clean-up so that the Premises are restored to the conditions required by this Lease. Upon Landlord's approval of the Clean-up plan, Tenant shall, at Tenant's sole cost and expense, without limitation on any rights and remedies of Landlord under this Lease, immediately implement such plan with a consultant reasonably acceptable to Landlord and proceed to Clean-Up Hazardous Materials in accordance with all Applicable Laws and as required by such plan and this Lease. If, within thirty (30) days after receiving a copy of such Environmental Report, Tenant fails either (a) to complete such Clean-up, or (b) with respect to any Clean-up that cannot be completed within such thirty-day period, fails to proceed with diligence to prepare the Clean-up plan and complete the Clean-up as promptly as practicable, then Landlord shall have the right, but not the obligation, and without waiving any other rights under this Lease, to carry out any Clean-up recommended by the Environmental Report or required by any governmental authority having jurisdiction over the Premises, and recover all of the costs and expenses thereof from Tenant as Additional Rent, payable within ten (10) business days after receipt of written demand therefor.

5.4.4.2 **No Rent Abatement**. Tenant shall continue to pay all Rent due or accruing under this Lease during any Clean-up, and shall not be entitled to any reduction, offset or deferral of any Base Rent or Additional Rent due or accruing under this Lease during any such Clean-up.

5.4.4.3 **Surrender of Premises**. Tenant shall complete any Clean-up prior to surrender of the Premises upon the expiration or earlier termination of this Lease, and shall fully comply with all Environmental Laws and requirements of any governmental authority with respect to such completion, including, without limitation, fully comply with any requirement to file a risk assessment, mitigation plan or other information with any such governmental authority in conjunction with the Clean-up prior to such surrender. Tenant shall obtain and deliver to Landlord a letter or other written determination from the overseeing governmental authority confirming that the Clean-up has been completed in accordance with all requirements of such governmental authority and that no further response action is required for the unrestricted use of the Premises from an Environmental Law standpoint ("**Closure Letter**"). Upon the expiration or earlier termination of this Lease, Tenant shall also be obligated to close all permits obtained in connection with Hazardous Materials in accordance with applicable laws.

5.4.4.4 **Failure to Timely Clean-Up**. Should any Clean-up for which Tenant is responsible not be completed, or should Tenant not receive the Closure Letter and any governmental approvals required under Environmental Laws in conjunction with such Clean-up prior to the expiration or earlier termination of this Lease, and Tenant's failure to receive the Closure Letter is prohibiting Landlord from leasing the Premises or any part thereof to a third party, or prevents the occupancy or use of the Premises or any part thereof by a third party, then Tenant shall be liable to Landlord as a holdover tenant (as more particularly provided in Article 16) until Tenant has fully complied with its obligations under this Section 5.4.

5.4.5 **Confidentiality**. Unless compelled to do so by Applicable Law, Tenant agrees that Tenant shall not disclose, discuss, disseminate or copy any information, data, findings, communications, conclusions and reports regarding the environmental condition of the Premises to any Person (other than Tenant's consultants, attorneys, property managers and employees that have a need to know such information), including any governmental authority, without the prior written consent of Landlord, not to be unreasonably withheld, conditioned, or delayed. In the event Tenant reasonably believes that disclosure is compelled by Applicable Law, it shall provide Landlord ten (10) days' advance notice of disclosure of confidential information so that Landlord may attempt to obtain a protective order. Tenant may additionally release such information to bona fide prospective purchasers or lenders, subject to any such parties' written agreement to be bound by the terms of this Section 5.4.

5.4.6 **Copies of Environmental Reports**. Within thirty (30) days of receipt thereof, Tenant shall provide Landlord with a copy of any and all environmental assessments, audits, studies and reports regarding Tenant's activities with respect to the Premises, or ground water beneath the Land, or the environmental condition or Clean-up thereof. Tenant shall be obligated to provide Landlord with a copy of such materials without regard to whether such materials are generated by Tenant or prepared for Tenant, or how Tenant comes into possession of such materials.

5.4.7 **Intentionally Omitted**.

5.4.8 **Signs, Response Plans, Etc**. Tenant shall be responsible for posting on the Premises any signs required under applicable Environmental Laws. Tenant shall also complete and file any business response plans or inventories required by any Applicable Laws. Tenant shall concurrently file a copy of any such business response plan or inventory with Landlord.

5.4.9 **Survival**. Each covenant, agreement, representation, warranty and indemnification made by Tenant set forth in this Section 5.4 shall survive the expiration or earlier termination of this Lease and shall remain effective until all of Tenant's obligations under this Section 5.4 have been completely performed and satisfied.

6. SERVICES AND UTILITIES

6.1 **Landlord Provided Services**. Landlord shall provide the following services on all days (unless otherwise stated below) during the Lease Term.

6.1.1 Subject to limitations imposed by all governmental rules, regulations and guidelines applicable thereto, Landlord shall provide adequate electrical wiring and facilities for connection to Tenant's lighting fixtures and incidental use equipment, provided that the connected electrical load of the incidental use equipment and the connected electrical load of Tenant's lighting fixtures does not exceed Tenant's Share of the system capacity (as reasonably documented by Landlord). Tenant shall bear the cost of replacement of lamps, starters and ballasts for lighting fixtures within the Premises.

6.1.2 Landlord shall provide city water from the regular Building outlets for drinking, lavatory and toilet purposes in the Building Common Areas and service to the Premises.

6.1.3 Landlord shall provide a dumpster and/or trash compactor at the Building for use by Tenant and other tenants for ordinary office waste (and not for Hazardous Materials).

6.1.4 Landlord shall provide landscaping, snow and ice removal in the Common Areas.

6.1.5 Landlord shall provide access to the rooftop as stated in Section 7.2.

6.1.6 Landlord shall provide Building standard heating, ventilation (including exhaust) and air conditioning ("**HVAC**").

6.2 **Tenant Provided Services and Utilities**. Except as otherwise expressly set forth in Section 6.1, above, Tenant will be responsible, at its sole cost and expense, for the furnishing of all services and utilities to the Premises including internet, telephone, janitorial and interior Building security services.

6.2.1 Landlord shall not provide janitorial or trash services for the Premises except as expressly provided in Section 6.1.3, above. Tenant shall be solely responsible for performing all janitorial and trash services and other cleaning of the Premises, all in compliance with Applicable Laws. In the event such service is provided by a third party janitorial service, and not by employees of Tenant, such service shall be a janitorial service approved in advance by Landlord, (Landlord shall provide Tenant with a list of approved vendors upon Tenant's request). The janitorial and cleaning of the Premises shall be adequate to maintain the Premises in a manner consistent with Comparable Buildings.

6.2.2 Subject to Applicable Laws and the other provisions of this Lease (including, without limitation, the Rules and Regulations, and except in the event of an emergency), Tenant shall have access to the Building, the Premises and the Common Areas of the Building, other than Common Areas requiring access with a Building engineer, twenty-four (24) hours per day, seven (7) days per week, every day of the year; provided, however, that Tenant shall only be permitted to have access to and use of the limited-access areas of the Building during the normal operating hours of such portions of the Building.

Tenant shall reasonably cooperate with Landlord at all times and abide by all regulations and requirements that Landlord may reasonably prescribe for the proper functioning and protection of the HVAC, electrical, mechanical and plumbing systems.

6.2.3 Tenant shall pay for all water, gas, heat, light, power, telephone, internet service, cable television, other telecommunications and other utilities supplied to the Premises, together with any fees, surcharges and taxes thereon, whether part of Operating Expenses or as provided under this Article 6. Tenant shall pay all costs and expenses for any separately metered utilities provided exclusively to the Premises directly to the applicable service provider. Tenant shall pay all actual out-of-pocket costs and expenses, without mark-up, for utility charges that are based on a check- or sub-metering metering installation based on Landlord's reading of such meters and directly to Landlord, including without limitation for utility charges for power, gas and water serving the HVAC system of the Building (which are measured by the control management system of the Building based on air volume provided to each tenant space). Additional Rent for such utilities may be reasonably estimated monthly by Landlord, based on actual readings of sub- and "check" meters where applicable, and shall be paid monthly by Tenant within thirty (30) days after being billed with a final accounting based upon actual bills received from the utility providers following the conclusion of each fiscal year of the Building.

6.3 **Metering**. If necessary, Landlord may install devices to separately meter any utility use (or use other reasonable industry standard methods to reasonably estimate such use) and in such event Tenant shall pay the cost directly to Landlord, within thirty (30) days after Tenant's receipt of an invoice therefor, at the rates charged by the public utility company furnishing the same, including the cost of installing, testing and maintaining of such metering devices. Tenant's use of electricity and any other utility shall never exceed the capacity of the feeders to the Project or the risers or wiring installation or Tenant's Share of the per floor limits as reasonably determined and documented by Landlord.

6.4 **Interruption of Use**. Tenant agrees that, to the extent permitted pursuant to Applicable Laws, Landlord shall not be liable for damages, by abatement of Rent or otherwise, for failure to furnish or delay in furnishing any service (including telephone and telecommunication services), or for any diminution in the quality or quantity thereof, when such failure or delay or diminution is occasioned, in whole or in part, by breakage, repairs, replacements, or improvements, by any strike, lockout or other labor trouble, by inability to secure electricity, gas, water, or other fuel at the Building or Project after reasonable effort to do so, by any riot or other dangerous condition, emergency, accident or casualty whatsoever, by act or default of Tenant or other parties, or by any other cause not under Landlord's reasonable control; and such failures or delays or diminution shall never be deemed to constitute an eviction or disturbance of Tenant's use and possession of the Premises or relieve Tenant from paying Rent or performing any of its obligations under this Lease. Furthermore, Landlord shall not be liable under any circumstances for a loss of, or injury to, property or for injury to, or interference with, Tenant's business, including, without limitation, loss of profits, however occurring, through or in connection with or incidental to a failure to furnish any of the services or utilities as set forth in this Article 6.

Notwithstanding the foregoing to the contrary, in the event that there shall be an interruption, curtailment or suspension of any service required to be provided by Landlord pursuant to Section 6.1 (and no reasonably equivalent alternative service or supply is provided by Landlord) that shall materially interfere with Tenant's use and enjoyment of a material portion of the Premises, and Tenant actually ceases to use affected portion of the Premises (any such event, a "**Service Interruption**"), and if (i) such Service Interruption shall continue for seventy-two (72) consecutive hours following receipt by Landlord of written notice from Tenant describing such Service Interruption (the "**Service Interruption Notice**"), (ii) such Service Interruption shall not have been caused, in whole or in part, by reasons beyond Landlord's reasonable control or by an act or omission in violation of this Lease by Tenant or by any negligence of Tenant, or Tenant's agents, employees, contractors or invitees, and (iii) either (A) Landlord does not diligently commence and pursue to completion the remedy of such Service Interruption or (B) Landlord receives proceeds from its rental interruption insurance that covers such Service Interruption (a Service Interruption that satisfies the foregoing conditions being referred to hereinafter as a "**Material Service Interruption**") then, as liquidated damages and Tenant's sole remedy at law or equity, Tenant shall be entitled to an equitable abatement of Base Rent and Tenant's Share of Direct Expenses, based on the nature and duration of the Material Service Interruption, the area of the Premises affected, and the then current Rent amounts, for the period that shall begin on the commencement of such Material Service Interruption and that shall end on the day such Material Service Interruption shall cease. To the extent a Material Service Interruption is caused by an event covered by Articles 11 or 13 of this Lease, then Tenant's right to abate rent shall be governed by the terms of such Article 11 or 13, as applicable, and the provisions of this paragraph shall not apply

6.5 **Responsibility Matrix**. The matrix attached hereto as **Exhibit H** and incorporated by reference provides the maintenance, repair, services, and utilities responsibilities for Landlord and Tenant at the Premises and Building ("**Responsibility Matrix**"). Landlord reserves the right at any time to make reasonable changes to the Responsibility Matrix based on current conditions at the Building as in Landlord's reasonable judgment may from time to time be necessary for the management, safety, care and cleanliness of the Premises and Building. The parties shall perform the obligations as noted in the Responsibility Matrix and to the extent of any discrepancies between this Article 6 and the Responsibility Matrix the details in the Responsibility Matrix shall control.

7. REPAIRS

7.1 **Tenant Repairs**. Tenant shall, at Tenant's own expense, keep the Premises, including all improvements, fixtures, furnishings, supplemental/non-Building heating, ventilation (including exhaust) and air conditioning (which Tenant installs as part of the Tenant Improvements) ("**Supplemental HVAC**"), and systems and equipment therein (including, without limitation, plumbing fixtures and equipment such as dishwashers, garbage

disposals, and insta-hot dispensers), and the floor of the Building on which the Premises are located, in good order, repair and condition as received (ordinary wear and tear and casualty damage excepted) at all times during the Lease Term. In addition, Tenant shall, at Tenant's own expense, but under the supervision and subject to the prior reasonable approval of Landlord, and within any reasonable period of time specified by Landlord, promptly and adequately repair all damage to the Premises and replace or repair all damaged, broken, or worn fixtures and appurtenances, except for damage caused by ordinary wear and tear or beyond the reasonable control of Tenant; provided however, that, at Landlord's option, or if Tenant fails to make such repairs (after notice from Landlord a reasonable opportunity to do so), Landlord may, but need not, make such repairs and replacements, and Tenant shall pay Landlord the cost thereof, including a percentage of the cost thereof (to be uniformly established for the Building and/or the Project) sufficient to reimburse Landlord for all overhead, general conditions, fees and other costs or expenses arising from Landlord's involvement with such repairs and replacements forthwith upon being billed for same. Without limitation, Tenant shall be responsible for the Supplemental HVAC and Tenant shall secure, pay for, and keep in force contracts with appropriate and reputable service companies reasonably approved by Landlord providing for the regular maintenance of such systems.

7.2 **Riser Room and Rooftop Rights**. Landlord grants Tenant the right, subject to the terms and conditions of this Lease, to access the riser room and the roof of the Building in order to maintain, repair and replace the Supplemental HVAC equipment and any other mechanical equipment located in the riser room or on the roof for which Tenant is responsible to repair, maintain and replace. Tenant may not install additional locks on any access doors or any equipment in such areas. In the event the Tenant desires to move any rooftop equipment or install any new rooftop equipment the exact location and layout of such items must be approved in advance in writing by Landlord, such approval not to be unreasonably withheld, conditioned, or delayed. Tenant's access to the riser room for the purposes of exercising its rights and obligations under this Section 7.2 shall be limited to Building Hours by prior appointment with the property manager, except in the case of emergencies. In the event of an emergency Tenant shall utilize Landlord's after-hours contact information. Tenant shall be provided access to the rooftop at all times except during an emergency through card access with Tenant's personnel who are approved in advance by Landlord. Tenant shall engage Landlord's roofer before beginning any rooftop installations or repairs which affect the roof whether under this Section 7.2 or otherwise, and shall always comply with the roof warranty governing the protection of the roof and modifications to the roof. Tenant shall obtain a letter from Landlord's roofer following completion of such work stating that the roof warranty remains in effect. Tenant agrees that Tenant's access to the riser room or roof and any work on the roof shall be at Tenant's sole risk. Tenant shall indemnify, defend and hold Landlord harmless against any liability, claim or cost, including reasonable attorneys' fees, incurred in connection with the loss of life, personal injury, damage to property or business or any other loss or injury (except to the extent due to the grossly negligent act or willful misconduct of Landlord or its employees, agents or contractors) arising out of the access to the riser room or rooftop or any work on the rooftop by Tenant or its employees, agents, or contractors, including any liability arising out of Tenant's violation of this Section 7.2. Tenant shall specifically be responsible for Landlord's costs to repair any damage or remedy any infraction caused by Tenant or Tenant's vendor in the riser room or on the roof of the Building. Landlord shall not be responsible for any damage or harm that result from Tenant's inability or delay to access the riser room or rooftop and Tenant hereby waives any claims against Landlord arising from such delays in access. The provisions of this paragraph shall survive the expiration or earlier termination of this Lease.

7.3 **Landlord Repairs**. Notwithstanding the foregoing, Landlord shall be responsible for repairs to the exterior walls, windows, foundation and roof (including roof membrane) of the Building, the structural portions of the floors of the Building, and the base building systems and equipment of the Building and Common Areas (to the extent not serving Tenant exclusively (but Landlord acknowledges and agrees that the air handler currently serving the Premises constitutes part of the base Building)), except to the extent that such repairs are required due to the gross negligence or willful misconduct of Tenant; provided, however, that if such repairs are due to the gross negligence or willful misconduct of Tenant, Landlord shall nevertheless make such repairs at Tenant's expense, or, if covered by Landlord's insurance, Tenant shall only be obligated to pay any deductible in connection therewith. Subject to the terms of Article 27, below, Landlord may, but shall not be required to, enter the Premises at all reasonable times and upon reasonable prior notice to make such repairs, alterations, improvements or additions to the Premises or to the Project or to any equipment located in the Project as Landlord shall reasonably desire or deem necessary or as Landlord may be required to do by governmental or quasi-governmental authority or court order or decree.

8. ADDITIONS AND ALTERATIONS

8.1 **Landlord's Consent to Alterations**. Tenant may not make any improvements, alterations, additions or changes to the Premises or any mechanical, plumbing or HVAC facilities or systems pertaining to the Premises (collectively, the "**Alterations**") without first procuring the prior written consent of Landlord to such Alterations, which consent shall be requested by Tenant not less than ten (10) business days prior to the commencement thereof, and which consent shall not be unreasonably withheld, conditioned or delayed by Landlord, provided it shall be deemed reasonable for Landlord to withhold its consent to any Alteration which adversely affects the structural portions or the systems or equipment of the Building or is visible from the exterior of the Building. Notwithstanding the foregoing, Tenant shall be permitted to make non-structural Alterations following ten (10) business days' notice to Landlord, but without Landlord's prior consent, to the extent that such Alterations (i) do not materially affect the Building roof, systems or equipment, (ii) are not visible from the exterior of the Building, and (iii) cost less than fifty thousand and 00/100 ($50,000.00) per year.

8.2 Prior to commencing any Alterations affecting air distribution or disbursement from ventilation systems serving Tenant or the Building, including without limitation the installation of Tenant's exhaust systems, Tenant shall provide Landlord with a third party report from a consultant, and in a form reasonably acceptable to Landlord, showing that such work will not materially and adversely affect the ventilation systems or air quality of the Building (or of any other tenant in the Building) and shall, upon completion of such work, provide Landlord with a certification reasonably satisfactory to Landlord from such consultant confirming that no such adverse effects have resulted from such work.

8.3 **Manner of Construction**. Landlord may impose, as an express condition of its consent (at the time said consent is given) to any and all Alterations (other than the Tenant Improvements) or repairs of the Premises or about the Premises, such requirements as Landlord in its reasonable discretion may deem desirable, including, but not limited to, the requirement that Tenant utilize for such purposes only contractors, subcontractors, materials, mechanics and materialmen selected by Tenant and approved by Landlord (which approval shall not be unreasonably withheld, conditioned or delayed), the requirement that upon Landlord's request at the time Landlord approves said Alterations (subject to the terms of Section 8.5, below), Tenant shall, at Tenant's expense, remove such Alterations upon the expiration or any early termination of the Lease Term. Tenant shall construct such Alterations and perform such repairs in a good and workmanlike manner, in conformance with any and all applicable federal, state, county or municipal laws, rules and regulations and pursuant to a valid building permit, issued by the city in which the Building is located (or other applicable governmental authority). Tenant shall not use (and upon notice from Landlord shall cease using) contractors, services, workmen, labor, materials or equipment that, in Landlord's reasonable judgment, would disturb labor harmony with the workforce or trades engaged in performing other work, labor or services in or about the Building or the Common Areas. Upon completion of any Alterations (or repairs), Tenant shall deliver to Landlord final lien waivers from all contractors, subcontractors and materialmen who performed such work. In addition to Tenant's obligations under Article 9 of this Lease, upon completion of any Alterations, Tenant shall deliver to the Project construction manager a reproducible copy of the "**as built**" drawings of the Alterations as well as all permits, approvals and other documents issued by any governmental agency in connection with the Alterations. Landlord shall make its construction rules and a pre-approved vendor list available to Tenant upon request.

8.4 **Payment for Improvements**. If Tenant orders any work directly from Landlord, Tenant shall pay to Landlord an amount equal to four percent (4%) of the cost of such work to compensate Landlord for all overhead, general conditions, fees and other costs and expenses arising from Landlord's involvement with such work. If Tenant does not order any work directly from Landlord, Tenant shall reimburse Landlord for Landlord's reasonable, actual, out-of-pocket costs and expenses actually incurred in connection with Landlord's review of such work including a construction management fee in the amount of two and one-half percent (2.5%) of the total costs of such work, up to but not to exceed a total payment by Tenant to Landlord of Forty Thousand and 00/100 Dollars ($40,000.000).

8.5 **Construction Insurance**. In addition to the requirements of Article 10 of this Lease, in the event that Tenant makes any Alterations, prior to the commencement of such Alterations, Tenant shall provide Landlord with evidence that Tenant carries "**Builder's All Risk**" insurance (to the extent that the cost of the work shall exceed $100,000.00) in an amount approved by Landlord covering the construction of such Alterations, and such other standard and reasonable insurance as Landlord may reasonably require, it being understood and agreed that all of such Alterations shall be insured by Tenant pursuant to Article 10 of this Lease immediately upon completion thereof. In

addition, Tenant's contractors and subcontractors shall be required to carry Commercial General Liability Insurance in an amount approved by Landlord and otherwise in accordance with the requirements of Article 10 of this Lease and such general liability insurance shall name the Landlord Parties as additional insureds. In addition, Tenant's contractors and subcontractors shall be required to carry workers compensation insurance with a waiver of subrogation in favor of Landlord Parties.

9. COVENANT AGAINST LIENS

Tenant shall keep the Project and Premises free from any liens or encumbrances arising out of the work performed, materials or services furnished or obligations incurred by or on behalf of Tenant, and shall protect, defend, indemnify and hold Landlord harmless from and against any claims, liabilities, judgments or costs (including, without limitation, reasonable attorneys' fees and costs) arising out of same or in connection therewith. Tenant shall give Landlord notice at least twenty (20) days prior to the commencement of any work, services or obligations related to the Premises giving rise to any such liens or encumbrances (or such additional time as may be necessary under Applicable Laws) to afford Landlord the opportunity of posting and recording appropriate notices of non-responsibility (to the extent applicable pursuant to then Applicable Laws). Tenant shall remove any such lien or encumbrance by statutory lien bond or otherwise within ten (10) business days after notice by Landlord, and if Tenant shall fail to do so, Landlord may pay the amount necessary to remove such lien or encumbrance, without being responsible for investigating the validity thereof.

10. INSURANCE

10.1 **Indemnification and Waiver**. Tenant hereby assumes all risk of damage to property or injury to persons in, upon or about the Premises from any cause whatsoever (including, but not limited to, any personal injuries resulting from a slip and fall in, upon or about the Premises) and agrees that Landlord, its lenders, partners, subpartners and their respective officers, agents, servants, employees, and independent contractors (collectively, "**Landlord Parties**") shall not be liable for, and are hereby released from any responsibility for, any damage either to person or property or resulting from the loss of use thereof, which damage is sustained by Tenant or by other persons claiming through Tenant. Tenant shall indemnify, defend, protect, and hold harmless the Landlord Parties from any and all loss, cost, damage, injury, expense and liability (including without limitation court costs and reasonable attorneys' fees) during the Lease Term, or any period of Tenant's occupancy of the Premises prior to the commencement or after the expiration of the Lease Term, incurred in connection with or arising from any cause in, on or about the Premises (including, but not limited to, a slip and fall), any acts, omissions or negligence of Tenant or of any person claiming by, through or under Tenant, or of the contractors, agents, servants, employees, invitees, guests or licensees of Tenant or any such person, in, on or about the Project or any breach of the terms of this Lease, either prior to, during, or after the expiration of the Lease Term, provided that the terms of the foregoing indemnity shall not apply to the gross negligence or willful misconduct of Landlord. Should Landlord be named as a defendant in any suit brought against Tenant in connection with or arising out of Tenant's occupancy of the Premises, Tenant shall pay to Landlord its reasonable costs and expenses incurred in such suit, including without limitation, its actual professional fees such as reasonable appraisers', accountants' and attorneys' fees. The provisions of this Section 10.1 shall survive the expiration or sooner termination of this Lease with respect to any claims or liability arising in connection with any event occurring prior to such expiration or termination.

10.2 **Tenant's Compliance With Landlord's Property Insurance**. Tenant shall, at Tenant's expense, comply with all reasonable insurance company requirements pertaining to the use of the Premises. If Tenant's conduct or use of the Premises for any purpose other than customary, general office use causes any increase in the premium for such insurance policies (as reasonably documented by Landlord) then Tenant shall reimburse Landlord for any such increase. Tenant, at Tenant's expense, shall comply with all rules, orders, regulations or requirements of the American Insurance Association (formerly the National Board of Fire Underwriters) and with any similar body.

10.3 **Tenant's Insurance**. Tenant shall maintain the following coverages in the following amounts.

10.3.1 Commercial General Liability Insurance on an occurrence form covering the insured against claims of bodily injury, personal and advertising injury and property damage (including loss of use thereof) arising out of Tenant's operations, products/completed operations, and contractual liability including a Broad Form endorsement covering the insuring provisions of this Lease and the performance by Tenant of the indemnity

agreements set forth in Section 10.1 of this Lease, and including, solely on a claims-made basis, products and completed operations coverage, for limits of liability of not less than:

Bodily Injury and Property Damage Liability	$5,000,000 each occurrence $5,000,000 annual aggregate
Personal and Advertising Injury Liability	$5,000,000 each occurrence $5,000,000 annual aggregate 0% Insured's participation

10.3.2 Property Insurance covering (i) all office furniture, business and trade fixtures, office equipment, free-standing cabinet work, movable partitions, merchandise and all other items of Tenant's property on the Premises installed by, for, or at the expense of Tenant, and (ii) any other improvements which exist in the Premises as of the Lease Commencement Date (excluding the Base Building) (the "**New Improvements**"). Such insurance shall be written on an "**all risks**" of physical loss or damage basis, for the full replacement cost value (subject to reasonable deductible amounts) new without deduction for depreciation of the covered items and in amounts that meet any co-insurance clauses of the policies of insurance and shall include coverage for damage or other loss caused by fire or other peril including, but not limited to, vandalism and malicious mischief, theft, water damage of any type, including sprinkler leakage, bursting or stoppage of pipes, and explosion.

10.3.3 Business Income Interruption for one (1) year plus Extra Expense insurance in such amounts as will reimburse Tenant for actual direct or indirect loss of earnings attributable to the risks outlined in Section 10.3.2 above.

10.3.4 Worker's Compensation and Employer's Liability or other similar insurance pursuant to all applicable state and local statutes and regulations. The policy will include a waiver of subrogation in favor of the Landlord Parties.

10.4 **Form of Policies**. The minimum limits of policies of insurance required of Tenant under this Lease shall in no event limit the liability of Tenant under this Lease. Such insurance shall (i) name Landlord, its subsidiaries and affiliates and any other party the Landlord so specifies, as an additional insured, as applicable, including Landlord's managing agent, if any; (ii) cover the liability assumed by Tenant under this Lease; (iii) be issued by an insurance company having a rating of not less than A:VIII in Best's Insurance Guide or which is otherwise acceptable to Landlord and licensed to do business in the State of North Carolina; (iv) be primary insurance as to all claims thereunder and provide that any insurance carried by Landlord is excess and is non-contributing with any insurance required of Tenant; (v) be in form and content reasonably acceptable to Landlord; and (vi) provide that said insurer shall endeavor to provide written notice to Landlord and any mortgagee of Landlord, to the extent such names are furnished to Tenant prior to the cancellation of such policy. Tenant shall deliver said policy or policies or certificates thereof to Landlord on or before the earlier to occur of (A) the Lease Commencement Date, and (B) the date upon which Tenant is first provided access to the Premises, and at least ten (10) days before the expiration dates thereof. In the event Tenant shall fail to procure such insurance, or to deliver such policies or certificate within ten (10) days after written notice from Landlord, Landlord may, at its option (upon notice to Tenant), procure such policies for the account of Tenant, and the cost thereof shall be paid to Landlord within five (5) days after delivery to Tenant of bills therefor.

10.5 **Subrogation**. Landlord and Tenant intend that their respective property loss risks shall be borne by reasonable insurance carriers to the extent above provided, and Landlord and Tenant hereby agree to look solely to, and seek recovery only from, their respective insurance carriers in the event of a property loss to the extent that such coverage is agreed to be provided hereunder. The parties each hereby waive all rights and claims against each other for such losses, and waive all rights of subrogation of their respective insurers, provided such waiver of subrogation shall not affect the right to the insured to recover thereunder. The parties agree that their respective insurance policies are now, or shall specify that the waiver of subrogation shall not affect the right of the insured to recover thereunder.

10.6 **Additional Insurance Obligations**. Tenant shall carry and maintain during the entire Lease Term, at Tenant's sole cost and expense, increased amounts of insurance to the extent required by any lender or mortgagee on the Building.

10.7 **Landlord Insurance Obligations**. Landlord shall keep in force during the term of this Lease at least the following coverage: (i) commercial general liability insurance against any and all claims for bodily injury and property damage occurring in or about the Building or the Common Areas having a combined single limit of not less than One Million Dollars ($1,000,000) per occurrence and Two Million Dollars ($2,000,000) in the aggregate, and (ii) property insurance for fire, casualty and special causes of loss in such amounts and coverages as Landlord deems appropriate or is otherwise required of Landlord by its lender or Applicable Law, but in no event less than the lesser of (a) at least one hundred percent (100%) percent of the replacement cost of the Building or (b) the maximum insurable value of the Building.

11. DAMAGE AND DESTRUCTION

11.1 **Repair of Damage to Premises by Landlord**. Tenant shall promptly notify Landlord of any damage to the Premises resulting from fire or any other casualty. If the Premises or any Common Areas serving or providing access to the Premises shall be damaged by fire or other casualty, Landlord shall promptly and diligently, subject to reasonable delays for insurance adjustment or other matters beyond Landlord's reasonable control, and subject to all other terms of this Article 11, restore such Common Areas and the Premises to substantially the same condition as existed prior to the casualty, except for modifications required by zoning and building codes and other laws or by the holder of a mortgage on the Building or Project or any other modifications to the Common Areas deemed desirable by Landlord, which are consistent with the character of the Project, provided that access to the or the use of Premises shall not be materially impaired. Upon the occurrence of any damage to the Premises, upon notice (the "**Landlord Repair Notice**") to Tenant from Landlord, Tenant shall assign to Landlord (or to any party designated by Landlord) all insurance proceeds payable to Tenant under Tenant's insurance required under Section 10.3.2(ii) of this Lease and Landlord's obligation to restore any Alterations or Tenant Improvements shall be limited to the extent of such proceeds received by Landlord. To the extent permitted pursuant to Applicable Laws, Landlord shall not be liable for any inconvenience or annoyance to Tenant or its visitors, or injury to Tenant's business resulting in any way from such damage or the repair thereof; provided however, that if such fire or other casualty shall have damaged the Premises or Common Areas necessary to Tenant's occupancy, and the Premises, or a material portion of the Premises, are not occupied by Tenant as a result thereof, then during the time and to the extent the Premises are unfit for occupancy, the Rent shall be abated in proportion to the ratio that the amount of rentable square feet of the Premises which is unfit for occupancy for the purposes permitted under this Lease bears to the total rentable square feet of the Premises.

11.2 **Landlord's Option to Repair**. Notwithstanding the terms of Section 11.1 of this Lease, Landlord may elect not to rebuild and/or restore the Premises, Building and/or Project, and instead terminate this Lease, by notifying Tenant in writing of such termination within forty-five (45) days after the date of discovery of the damage, such notice to include a termination date giving Tenant sixty (60) days to vacate the Premises, but Landlord may so elect only if the Building or Project shall be damaged by fire or other casualty or cause, whether or not the Premises are affected, and one or more of the following conditions is present: (i) in Landlord's reasonable judgment, repairs cannot reasonably be completed within one hundred eighty (180) days after the date of discovery of the damage (when such repairs are made without the payment of overtime or other premiums); (ii) the holder of any mortgage on the Building or Project or ground lessor with respect to the Building or Project shall require that the insurance proceeds or any portion thereof be used to retire the mortgage debt, or shall terminate the ground lease, as the case may be; (iii) at least Ten Thousand and 00/100 Dollars ($10,000.00) of damage is not fully covered by Landlord's insurance policies; (iv) intentionally omitted; (v) the damage occurs during the last twelve (12) months of the Lease Term; or (vi) any owner of any other portion of the Project, other than Landlord, does not intend to repair the damage to such portion of the Project; provided, however, that if Landlord does not elect to terminate this Lease pursuant to Landlord's termination right as provided above, and the repairs cannot, in the reasonable opinion of Landlord, be completed within one hundred eighty (180) days after the date of the damage, Tenant may elect, no earlier than thirty (30) days after the date of the damage and not later than ninety (90) days after the date of such damage, to terminate this Lease by written notice to Landlord effective as of the date specified in the notice, which date shall not be less than thirty (30) days nor more than sixty (60) days after the date such notice is given by Tenant. Notwithstanding the provisions of this Section 11.2, Tenant shall have the right to terminate this Lease under this Section 11.2 only if each of the following conditions is satisfied: (a) the damage to the Project by fire or other casualty was not caused by the gross negligence or intentional act of Tenant or its partners or subpartners and their respective officers, agents, servants, employees, and independent contractors; and (b) as a result of the damage, Tenant cannot reasonably conduct business

from the Premises. In addition, Tenant may terminate this Lease if the damage to the Premises occurs during the last twelve (12) months of the Lease Term and such repair will take more than 10% of the remaining Term to repair.

12. NONWAIVER

No provision of this Lease shall be deemed waived by either party hereto unless expressly waived in a writing signed thereby. The waiver by either party hereto of any breach of any term, covenant or condition herein contained shall not be deemed to be a waiver of any subsequent breach of same or any other term, covenant or condition herein contained. The subsequent acceptance of Rent hereunder by Landlord shall not be deemed to be a waiver of any preceding breach by Tenant of any term, covenant or condition of this Lease, other than the failure of Tenant to pay the particular Rent so accepted, regardless of Landlord's knowledge of such preceding breach at the time of acceptance of such Rent. No acceptance of a lesser amount than the Rent herein stipulated shall be deemed a waiver of Landlord's right to receive the full amount due, nor shall any endorsement or statement on any check or payment or any letter accompanying such check or payment be deemed an accord and satisfaction, and Landlord may accept such check or payment without prejudice to Landlord's right to recover the full amount due. No receipt of monies by Landlord from Tenant after the termination of this Lease shall in any way alter the length of the Lease Term or of Tenant's right of possession hereunder, or after the giving of any notice shall reinstate, continue or extend the Lease Term or affect any notice given Tenant prior to the receipt of such monies, it being agreed that after the service of notice or the commencement of a suit, or after final judgment for possession of the Premises, Landlord may receive and collect any Rent due, and the payment of said Rent shall not waive or affect said notice, suit or judgment.

13. CONDEMNATION

If the whole or any part of the Premises, Building or Project shall be taken by power of eminent domain or condemned by any competent authority for any public or quasi-public use or purpose, or if any adjacent property or street shall be so taken or condemned, or reconfigured or vacated by such authority in such manner as to require the use, reconstruction or remodeling of any part of the Premises, Building or Project, or if Landlord shall grant a deed or other instrument in lieu of such taking by eminent domain or condemnation, Landlord shall have the option to terminate this Lease effective as of the date possession is required to be surrendered to the authority. Tenant shall not because of such taking assert any claim against Landlord or the authority for any compensation because of such taking and Landlord shall be entitled to the entire award or payment in connection therewith, except that Tenant shall have the right to file any separate claim available to Tenant for any taking of Tenant's personal property and fixtures belonging to Tenant and removable by Tenant upon expiration of the Lease Term pursuant to the terms of this Lease, and for moving expenses, so long as such claims do not diminish the award available to Landlord, its ground lessor with respect to the Building or Project or its mortgagee, and such claim is payable separately to Tenant. All Rent shall be apportioned as of the date of such termination. If any part of the Premises shall be taken, and this Lease shall not be so terminated, the Rent shall be proportionately abated. Notwithstanding anything to the contrary contained in this Article 13, in the event of a temporary taking of all or any portion of the Premises for a period of one hundred and eighty (180) days or less, and provided that such temporary taking does not materially preclude or unreasonably diminish Tenant's ability to conduct business from the Premises, then this Lease shall not terminate but the Base Rent and the Additional Rent shall be abated for the period of such taking in proportion to the ratio that the amount of rentable square feet of the Premises taken bears to the total rentable square feet of the Premises. Landlord shall be entitled to receive the entire award made in connection with any such temporary taking, provided, however, that Tenant shall be entitled to a share of the award for any loss of fixtures and improvements and for moving and other reasonable expenses that do not otherwise reduce Landlord's recovery.

14. ASSIGNMENT AND SUBLETTING

14.1 **Transfers**. Tenant shall not, without the prior written consent of Landlord, assign, mortgage, pledge, hypothecate, encumber, or permit any lien to attach to, or otherwise transfer, this Lease or any interest hereunder, permit any assignment, or other transfer of this Lease or any interest hereunder by operation of law, sublet the Premises or any part thereof, or enter into any license or concession agreements or otherwise permit the occupancy or use of the Premises or any part thereof by any persons other than Tenant and its employees and contractors (all of the foregoing are hereinafter sometimes referred to collectively as "**Transfers**" and any person to whom any Transfer is made or sought to be made is hereinafter sometimes referred to as a "**Transferee**"). If Tenant desires Landlord's consent to any Transfer, Tenant shall notify Landlord in writing, which notice (the "**Transfer Notice**") shall include (i) the proposed effective date of the Transfer, which shall not be less than twenty (20) days nor more than one hundred eighty (180) days after the date of delivery of the Transfer Notice, (ii) a description of the portion of the Premises to be transferred (the "**Subject Space**"), (iii) all of the terms of the proposed Transfer and the consideration therefor, including calculation of the "**Transfer Premium**", as that term is defined in Section 14.3 below, in connection with such Transfer, the name and address of the proposed Transferee, and a copy of all existing executed and/or proposed documentation pertaining to the proposed Transfer, and (iv) current financial statements of the proposed Transferee certified by an officer, partner or owner thereof, business credit and personal references and history of the proposed Transferee and any other information reasonably required by Landlord which will enable Landlord to determine the financial responsibility, character, and reputation of the proposed Transferee, nature of such Transferee's business and proposed use of the Subject Space. Any Transfer made without Landlord's prior written consent shall, at Landlord's option, be null, void and of no effect, and shall, at Landlord's option, constitute a default by Tenant under this Lease. Whether or not Landlord consents to any proposed Transfer, Tenant shall pay Landlord's reasonable review and processing fees(not to exceed $1,500.00 for Landlord's internal costs) plus any reasonable professional fees (including, without limitation, attorneys', accountants', architects', engineers' and consultants' fees) incurred by Landlord, within thirty (30) days after written request by Landlord.

14.2 **Landlord's Consent**. Landlord shall not unreasonably withhold, condition or delay its consent to any proposed Transfer of the Subject Space to the Transferee on the terms specified in the Transfer Notice. Without limitation as to other reasonable grounds for withholding consent, the parties hereby agree that it shall be reasonable under this Lease and under any applicable law for Landlord to withhold consent to any proposed Transfer where one or more of the following apply:

14.2.1 The Transferee is of a character or reputation or engaged in a business which is not consistent with the quality of the Building or the Project;

14.2.2 The Transferee is either a governmental agency or instrumentality thereof;

14.2.3 The Transferee is not a party of reasonable financial worth and/or financial stability in light of the responsibilities to be undertaken in connection with the Transfer on the date consent is requested;

14.2.4 The proposed Transfer would cause a violation of another lease for space in the Project, or would give an occupant of the Project a right to cancel its lease; or

14.2.5 Either the proposed Transferee, or any person or entity which directly or indirectly, controls, is controlled by, or is under common control with, the proposed Transferee, is actively negotiating with Landlord or has negotiated with Landlord during the four (4) month period immediately preceding the date Landlord receives the Transfer Notice, to lease space in the Project (and Landlord has suitable space available in the Project to meet Transferee's needs).

14.2.6 In Landlord's reasonable determination, the sub-rent, additional rent or other amounts received or accrued by Tenant from subleasing, assigning or otherwise Transferring all or any portion of the Premises is based on the income or profits of any person, or the assignment of sublease could cause any portion of the amounts received by Landlord pursuant to this Lease to fail to qualify as "rents from real property" within the meaning of section 856(d) of the Internal Revenue Code of 1986, as amended (the "Code"), or any similar or successor provision thereto or which would cause any other income of Landlord to fail to qualify as income described in section 856(c)(2) of the Code.

If Landlord consents to any Transfer pursuant to the terms of this Section 14.2 (and does not exercise any recapture rights Landlord may have under Section 14.4 of this Lease), Tenant may within six (6) months after Landlord's consent, but not later than the expiration of said six-month period, enter into such Transfer of the Premises or portion thereof, upon substantially the same terms and conditions as are set forth in the Transfer Notice furnished by Tenant to Landlord pursuant to Section 14.1 of this Lease, provided that if there are any material changes in the terms and conditions from those specified in the Transfer Notice such that Landlord would initially have been entitled to refuse its consent to such Transfer under this Section 14.2, Tenant shall again submit the Transfer to Landlord for its approval and other action under this Article 14 (including Landlord's right of recapture, if any, under Section 14.4 of this Lease). Notwithstanding anything to the contrary in this Lease, if Tenant or any proposed Transferee claims

that Landlord has unreasonably withheld or delayed its consent under Section 14.2 or otherwise has breached or acted unreasonably under this Article 14, their sole remedies shall be a suit for contract damages (other than damages for injury to, or interference with, Tenant's business including, without limitation, loss of profits, however occurring) or declaratory judgment and an injunction for the relief sought, and Tenant hereby waives all other remedies, including, without limitation, any right at law or equity to terminate this Lease, on its own behalf and, to the extent permitted under all Applicable Laws, on behalf of the proposed Transferee.

14.3 **Transfer Premium**. If Landlord consents to a Transfer, as a condition thereto which the parties hereby agree is reasonable, Tenant shall pay to Landlord fifty percent (50%) of any "**Transfer Premium**," as that term is defined in this Section 14.3, received by Tenant from such Transferee (other than any Permitted Transferee). "**Transfer Premium**" shall mean all rent, additional rent or other consideration payable by such Transferee in connection with the Transfer in excess of the Rent and Additional Rent payable by Tenant under this Lease during the term of the Transfer on a per rentable square foot basis if less than all of the Premises is transferred, after deducting the reasonable third party expenses incurred by Tenant for (i) any design and construction costs incurred on account of changes, alterations and improvements to the Premises in connection with the Transfer, (ii) any free base rent and tenant improvement allowances reasonably provided to the Transferee in connection with the Transfer (provided that such free rent and tenant improvement allowances shall be deducted only to the extent the same is included in the calculation of total consideration payable by such Transferee), (iii) any brokerage commissions in connection with the Transfer, (iv) legal fees and disbursements reasonably incurred in connection with the Transfer, and (v) any unamortized Excess Costs, as defined in Exhibit D (as determined on a straight line basis over the initial term of this Lease, without interest) paid by Tenant for the Tenant Improvements (collectively, "**Tenant's Subleasing Costs**"). "**Transfer Premium**" shall also include, but not be limited to, key money, bonus money or other cash consideration paid by Transferee to Tenant in connection with such Transfer, and any payment in excess of fair market value for services rendered by Tenant to Transferee or for assets, fixtures, inventory, equipment, or furniture transferred by Tenant to Transferee in connection with such Transfer. The determination of the amount of Landlord's applicable share of the Transfer Premium shall be made on a monthly basis as rent or other consideration is received by Tenant under the Transfer.

14.4 **Landlord's Option as to Subject Space**. Notwithstanding anything to the contrary contained in this Article 14, in the event Tenant contemplates a Transfer which, together with all prior Transfers then remaining in effect, would cause seventy-five percent (75%) or more of the Premises to be Transferred for more than fifty percent (50%) of the then remaining Lease Term (assuming all sublease renewal or extension rights are exercised), Tenant shall give Landlord notice (the "**Intention to Transfer Notice**") of such contemplated Transfer (whether or not the contemplated Transferee or the terms of such contemplated Transfer have been determined). The Intention to Transfer Notice shall specify the portion of and amount of rentable square feet of the Premises which Tenant intends to Transfer (the "**Contemplated Transfer Space**"), the contemplated date of commencement of the Contemplated Transfer (the "**Contemplated Effective Date**"), and the contemplated length of the term of such contemplated Transfer, and shall specify that such Intention to Transfer Notice is delivered to Landlord pursuant to this Section 14.4 in order to allow Landlord to elect to recapture the Contemplated Transfer Space. Thereafter, Landlord shall have the option, by giving written notice to Tenant within fifteen (15) days after receipt of any Intention to Transfer Notice, to recapture the Contemplated Transfer Space. Such recapture shall cancel and terminate this Lease with respect to such Contemplated Transfer Space as of the Contemplated Effective Date. In the event of a recapture by Landlord, if this Lease shall be canceled with respect to less than the entire Premises, the Rent reserved herein shall be prorated on the basis of the number of rentable square feet retained by Tenant in proportion to the number of rentable square feet contained in the Premises, and this Lease as so amended shall continue thereafter in full force and effect, and upon request of either party, the parties shall execute written confirmation of the same.

14.5 **Effect of Transfer**. If Landlord consents to a Transfer, (i) the terms and conditions of this Lease shall in no way be deemed to have been waived or modified, (ii) such consent shall not be deemed consent to any further Transfer by either Tenant or a Transferee, (iii) Tenant shall deliver to Landlord, promptly after execution, an original executed copy of all documentation pertaining to the Transfer in form reasonably acceptable to Landlord, (iv) intentionally omitted, and (v) no Transfer relating to this Lease or agreement entered into with respect thereto, whether with or without Landlord's consent, shall relieve Tenant or any guarantor of the Lease from any liability under this Lease, including, without limitation, in connection with the Subject Space.

14.6 **Sublease/Transfer Restrictions**. Notwithstanding anything contained herein to the contrary and without limiting the generality of Section 14.1 above, Tenant shall not: (a) sublet all or part of the Premises or assign or otherwise Transfer this Lease on any basis such that the rental or other amounts to be paid by the subtenant or assignee thereunder would be based, in whole or in part, on the income or profits derived by the business activities of the subtenant or assignee; (b) sublet all or part of the Premises or assign this Lease to any person or entity in which, under Section 856(d)(2)(B) of the Code, Longfellow Atlantic REIT, Inc., a Delaware corporation (the "Company"), or any affiliate of the Company owns, directly or indirectly (by applying constructive ownership rules set forth in Section 856(d) (5) of the Code), a ten percent (10%) or greater interest; or (c) sublet all or part of the Premises or assign this Lease in any other manner or otherwise derive any income which could cause any portion of the amounts received by Landlord pursuant hereto or any sublease to fail to qualify as "rents from real property" within the meaning of Section 856(d) of the Code, or which could cause any other income received by Landlord to fail to qualify as income described in Section 856(c) (2) of the Code. The requirements of this Section 14.4 shall likewise apply to any further subleasing, assignment or other Transfer by any subtenant or assignee. All references herein to Section 856 of the Code also shall refer to any amendments thereof or successor provisions thereto.

14.7 **Occurrence of Default**. Any Transfer hereunder shall be subordinate and subject to the provisions of this Lease, and if this Lease shall be terminated during the term of any Transfer, Landlord shall have the right to: (i) treat such Transfer as cancelled and repossess the Subject Space by any lawful means, or (ii) require that such Transferee attorn to and recognize Landlord as its landlord under any such Transfer. If Tenant shall be in default under this Lease (beyond applicable notice and cure period), Landlord is hereby irrevocably authorized to direct any Transferee to make all payments under or in connection with the Transfer directly to Landlord (which Landlord shall apply towards Tenant's obligations under this Lease) until such default is cured. Such Transferee shall rely on any representation by Landlord that Tenant is in default hereunder, without any need for confirmation thereof by Tenant. Upon any assignment, the assignee shall assume in writing all obligations and covenants of Tenant thereafter to be performed or observed under this Lease. No collection or acceptance of rent by Landlord from any Transferee shall be deemed a waiver of any provision of this Article 14 or the approval of any Transferee or a release of Tenant from any obligation under this Lease, whether theretofore or thereafter accruing. In no event shall Landlord's enforcement of any provision of this Lease against any Transferee be deemed a waiver of Landlord's right to enforce any term of this Lease against Tenant or any other person. If Tenant's obligations hereunder have been guaranteed, Landlord's consent to any Transfer shall not be effective unless the guarantor also consents to such Transfer.

14.8 **Non-Transfers**. Notwithstanding anything to the contrary contained in this Article 14, (i) an assignment or subletting of all or a portion of the Premises to an affiliate of Tenant (an entity which is controlled by, controls, or is under common control with, Tenant), (ii) an assignment of the Premises to an entity which acquires all or substantially all of the assets or interests (partnership, stock or other) of Tenant, (iii) an assignment of the Premises to an entity which is the resulting entity of a merger or consolidation of Tenant, or (iv) a sale of corporate shares of capital stock in Tenant in connection with an initial public offering of Tenant's stock on a nationally-recognized stock exchange (collectively, a "**Permitted Transferee**"), shall not be deemed a Transfer under this Article 14, provided that (A) Tenant notifies Landlord of any such assignment or sublease and promptly supplies Landlord with any documents or information reasonably requested by Landlord regarding such assignment or sublease or such affiliate, (B) such assignment or sublease is not a subterfuge by Tenant to avoid its obligations under this Lease, (C) such Permitted Transferee shall be of a character and reputation consistent with the quality of the Building, and (D) such Permitted Transferee shall have a tangible net worth (not including goodwill as an asset) computed in accordance with generally accepted accounting principles ("**Net Worth**") at least equal to the Net Worth of Tenant on the day immediately preceding the effective date of such assignment or sublease. An assignee of Tenant's entire interest that is also a Permitted Transferee may also be known as a "**Permitted Assignee**". "**Control**," as used in this Section 14.8, shall mean the ownership, directly or indirectly, of at least fifty-one percent (51%) of the voting securities of, or possession of the right to vote, in the ordinary direction of its affairs, of at least fifty-one percent (51%) of the voting interest in, any person or entity. No such permitted assignment or subletting shall serve to release Tenant from any of its obligations under this Lease.

15. SURRENDER OF PREMISES; OWNERSHIP AND REMOVAL OF TRADE FIXTURES

15.1 **Surrender of Premises**. No act or thing done by Landlord or any agent or employee of Landlord during the Lease Term shall be deemed to constitute an acceptance by Landlord of a surrender of the Premises unless such intent is specifically acknowledged in writing by Landlord. The delivery of keys to the Premises to Landlord or

any agent or employee of Landlord shall not constitute a surrender of the Premises or effect a termination of this Lease, whether or not the keys are thereafter retained by Landlord, and notwithstanding such delivery Tenant shall be entitled to the return of such keys at any reasonable time upon request until this Lease shall have been properly terminated. The voluntary or other surrender of this Lease by Tenant, whether accepted by Landlord or not, or a mutual termination hereof, shall not work a merger, and at the option of Landlord shall operate as an assignment to Landlord of all subleases or subtenancies affecting the Premises or terminate any or all such sublessees or subtenancies.

15.2 **Removal of Tenant Property by Tenant**. Upon the expiration of the Lease Term, or upon any earlier termination of this Lease, Tenant shall, subject to the provisions of this Article 15, quit and surrender possession of the Premises to Landlord in as good order and condition as when Tenant took possession and as thereafter improved by Landlord and/or Tenant, reasonable wear and tear and repairs which are specifically made the responsibility of Landlord hereunder excepted. Upon such expiration or termination, Tenant shall, without expense to Landlord, remove or cause to be removed from the Premises all debris and rubbish, and such items of furniture, equipment, free-standing cabinet work, movable partitions (not including modular "clean rooms" built into the Premises as part of the Tenant Improvements) and other articles of personal property owned by Tenant or installed or placed by Tenant at its expense in the Premises, and such similar articles of any other persons claiming under Tenant, as Landlord may, in its sole discretion, require to be removed, and Tenant shall repair at its own expense all damage to the Premises and Building resulting from such removal. In no event shall any Landlord's Work be deemed to be Tenant's personal property, it being the intent that Tenant's personal property includes only those items that are not built into the Premises and that have not been constructed or installed by Landlord pursuant to the Work Letter.

15.3 **Environmental Assessment**. Prior to the expiration of the Lease (or within thirty (30) days after any earlier termination), Tenant shall clean and otherwise decommission all interior surfaces (including floors, walls, ceilings, and counters), piping, supply lines, waste lines and plumbing in or serving the Premises, and all exhaust or other ductwork in or serving the Premises, in each case that has carried, released or otherwise been exposed to any Hazardous Materials due to Tenant's use or occupancy of the Premises, and shall otherwise clean the Premises so as to permit the Environmental Assessment called for by this Section 15.3 to be issued. Prior to the expiration of this Lease (or within thirty (30) days after any earlier termination), Tenant, at Tenant's expense, shall obtain for Landlord a report (an "**Environmental Assessment**") addressed to Landlord (and, at Tenant's election, Tenant) by a reputable licensed environmental consultant or industrial hygienist that is designated by Tenant and acceptable to Landlord in Landlord's reasonable discretion, which report shall be based on the environmental consultant's inspection of the Premises and shall state, to the Landlord's reasonable satisfaction, that (a) the Hazardous Materials described in the first sentence of this paragraph, to the extent, if any, existing prior to such decommissioning, have been removed in accordance with Applicable Laws; (b) all Hazardous Materials described in the first sentence of this paragraph, if any, have been removed in accordance with Applicable Laws from the interior surfaces of the Premises (including floors, walls, ceilings, and counters), piping, supply lines, waste lines and plumbing, and all such exhaust or other ductwork in the Premises, may be reused by a subsequent tenant or disposed of in compliance with Applicable Laws without incurring special costs or undertaking special procedures for demolition, disposal, investigation, assessment, cleaning or removal of such Hazardous Materials and without giving notice in connection with such Hazardous Materials; and (c) the Premises may be reoccupied for office, research and development, or laboratory use, demolished or renovated without incurring special costs or undertaking special procedures for disposal, investigation, assessment, cleaning or removal of Hazardous Materials described in the first sentence of this paragraph and without giving notice in connection with Hazardous Materials. Further, for purposes of clauses (b) and (c), "special costs" or "special procedures" shall mean costs or procedures, as the case may be, that would not be incurred but for the nature of the Hazardous Materials as Hazardous Materials instead of non-hazardous materials. The report shall also include reasonable detail concerning the clean-up measures taken, the clean-up locations, the tests run and the analytic results. Tenant shall submit to Landlord the scope of the proposed Environmental Assessment for Landlord's reasonable review and approval at least 30 days prior to commencing the work described therein or at least 60 days prior to the expiration of the Lease Term, whichever is earlier.

If Tenant fails to perform its obligations under this Section 15.3 without limiting any other right or remedy, Landlord may, on five (5) business days' prior written notice to Tenant perform such obligations at Tenant's expense if Tenant has not commenced to do so within said five day period, and Tenant shall within 10 days of written demand reimburse Landlord for all reasonable out-of-pocket costs and expenses incurred by Landlord in connection with such work. Tenant's obligations under this Section 15.3 shall survive the expiration or earlier termination of this Lease. In

addition, at Landlord's election, Landlord may inspect the Premises and/or the Project for Hazardous Materials at Landlord's cost and expense within sixty (60) days of Tenant's surrender of the Premises at the expiration or earlier termination of this Lease. Tenant shall pay for all such costs and expenses incurred by Landlord in connection with such inspection if such inspection reveals that a release of Hazardous Materials exists at the Project or Premises as a proximate result of the acts or omissions of Tenant, its officers, employees, contractors, and agents (except to the extent resulting from (i) Hazardous Materials existing in the Premises as at the delivery of possession to Tenant (in which event Landlord shall be responsible for any Clean-up, as provided in this Lease), or (ii) the acts or omissions of Landlord or Landlord's agents, employees or contractors).

16. HOLDING OVER

If Tenant holds over after the expiration of the Lease Term or earlier termination thereof, with the express or implied consent of Landlord, such tenancy shall be from month-to-month only, and shall not constitute a renewal hereof or an extension for any further term. If Tenant holds over after the expiration of the Lease Term of earlier termination thereof, without the express or implied consent of Landlord, such tenancy shall be deemed to be a tenancy by sufferance only, and shall not constitute a renewal hereof or an extension for any further term. In either case, Base Rent shall be payable at a monthly rate equal to one hundred twenty-five percent (125%) of the Base Rent applicable during the last rental period of the Lease Term under this Lease for the first two (2) months of such holdover with such rate increasing to one hundred fifty percent (150%) of the Base Rent if Tenant holdsover longer than two (2) months. Such month-to-month tenancy or tenancy by sufferance, as the case may be, shall be subject to every other applicable term, covenant and agreement contained herein. Nothing contained in this Article 16 shall be construed as consent by Landlord to any holding over by Tenant, and Landlord expressly reserves the right to require Tenant to surrender possession of the Premises to Landlord as provided in this Lease upon the expiration or other termination of this Lease. The provisions of this Article 16 shall not be deemed to limit or constitute a waiver of any other rights or remedies of Landlord provided herein or at law. If Tenant fails to surrender the Premises upon the termination or expiration of this Lease, in addition to any other liabilities to Landlord accruing therefrom, Tenant shall protect, defend, indemnify and hold Landlord harmless from all loss, costs (including reasonable attorneys' fees) and liability resulting from such failure, including, without limiting the generality of the foregoing, any claims made by any succeeding tenant founded upon such failure to surrender and any lost profits to Landlord resulting therefrom.

17. ESTOPPEL CERTIFICATES

Within ten (10) business days following a request in writing by Landlord, Tenant shall execute, acknowledge and deliver to Landlord an estoppel certificate, which, as submitted by Landlord, shall be substantially in the form of **Exhibit F**, attached hereto (or such other commercially reasonable form as may be required by any prospective mortgagee or purchaser of the Project, or any portion thereof), indicating therein any exceptions thereto that may exist at that time, and shall also contain any other information reasonably requested by Landlord or Landlord's mortgagee or prospective mortgagee. Any such certificate may be relied upon by any prospective mortgagee or purchaser of all or any portion of the Project. Tenant shall execute and deliver whatever other instruments may be reasonably required for such purposes. At any time during the Lease Term, but not more often than twice per year, Landlord may require Tenant to provide Landlord with a current financial statement and financial statements of the two (2) years prior to the current financial statement year. Such statements shall be prepared in accordance with generally accepted accounting principles and, if such is the normal practice of Tenant, shall be audited by an independent certified public accountant. Failure of Tenant to timely execute, acknowledge and deliver such estoppel certificate or other instruments shall constitute an acceptance of the Premises and an acknowledgment by Tenant that statements included in the estoppel certificate are true and correct, without exception.

18. SUBORDINATION

This Lease shall be subject and subordinate to all present and future ground or underlying leases of the Building or Project and to the lien of any mortgage, trust deed or other encumbrances now or hereafter in force against the Building or Project or any part thereof, if any, and to all renewals, extensions, modifications, consolidations and replacements thereof, and to all advances made or hereafter to be made upon the security of such mortgages or trust deeds, unless the holders of such mortgages, trust deeds or other encumbrances, or the lessors under such ground lease or underlying leases, require in writing that this Lease be superior thereto. Tenant covenants and agrees in the event any proceedings are brought for the foreclosure of any such mortgage or deed in lieu thereof (or if any ground lease

is terminated), to attorn, without any deductions or set-offs whatsoever, to the lienholder or purchaser or any successors thereto upon any such foreclosure sale or deed in lieu thereof (or to the ground lessor), if so requested to do so by such purchaser or lienholder or ground lessor, and to recognize such purchaser or lienholder or ground lessor as the lessor under this Lease, provided such lienholder or purchaser or ground lessor shall agree to accept this Lease and not disturb Tenant's occupancy, so long as Tenant timely pays the rent and observes and performs the terms, covenants and conditions of this Lease to be observed and performed by Tenant. Landlord's delivery to Tenant of commercially reasonable non-disturbance agreement(s) in favor of Tenant from any ground lessors, mortgage holders or lien holders of Landlord who come into existence following the date hereof but prior to the expiration of the Lease Term shall be in consideration of, and a condition precedent to, Tenant's agreement to subordinate this Lease to any such ground lease, mortgage or lien. Landlord's interest herein may be assigned as security at any time to any lienholder. Tenant shall, within ten (10) business days of request by Landlord, execute such further commercially reasonable instruments or assurances as Landlord may reasonably deem necessary to evidence or confirm the subordination or superiority of this Lease to any such mortgages, trust deeds, ground leases or underlying leases. Tenant waives the provisions of any current or future statute, rule or law which may give or purport to give Tenant any right or election to terminate or otherwise adversely affect this Lease and the obligations of the Tenant hereunder in the event of any foreclosure proceeding or sale.

19. DEFAULTS; REMEDIES

19.1 **Events of Default**. The occurrence of any of the following shall constitute a default of this Lease by Tenant:

19.1.1 Any failure by Tenant to pay any Rent or any other charge required to be paid under this Lease, or any part thereof, when due (provided, however, that it shall not be a default if Tenant makes full payment within five (5) business days after receipt of written notice of any delinquency; provided that Landlord shall not be required to provide more than one (1) such notices in any twelve (12) month period during the Lease Term); or

19.1.2 Except where a specific time period is otherwise set forth for Tenant's performance in this Lease, in which event the failure to perform by Tenant within such time period shall be a default by Tenant under this Section 19.1.2, any failure by Tenant to observe or perform any other provision, covenant or condition of this Lease to be observed or performed by Tenant where such failure continues for thirty (30) days after written notice thereof from Landlord to Tenant; provided that if the nature of such default is such that the same cannot reasonably be cured within a thirty (30) day period, Tenant shall not be deemed to be in default if it diligently commences such cure within such period and thereafter diligently proceeds to rectify and cure such default; or

19.1.3 Abandonment of the Premises by Tenant and failure to perform any obligation under this Lease regarding the maintenance, cleanliness or operation of the Premises within five (5) business days after notice from Landlord; or

19.1.4 The failure by Tenant to observe or perform according to the provisions of Articles 5, 14, 17 or 18 of this Lease where such failure continues for more than two (2) business days after notice from Landlord.

The notice periods provided herein are in lieu of, and not in addition to, any notice periods provided by law.

19.2 **Remedies Upon Default**. Upon the occurrence of any event of default by Tenant, Landlord shall have, in addition to any other remedies available to Landlord at law or in equity (all of which remedies shall be distinct, separate and cumulative), the option to pursue any one or more of the following remedies, each and all of which shall be cumulative and nonexclusive, without any separate notice or demand whatsoever.

19.2.1 Landlord may, immediately or at any time thereafter, elect to terminate this Lease by notice of termination, by entry, or by any other means available under law and may recover possession of the Premises as provided herein. Upon termination by notice, by entry, or by any other means available under law, Landlord shall be entitled immediately, in the case of termination by notice or entry, and otherwise in accordance with the provisions of law to recover possession of the Premises from Tenant and those claiming through or under the Tenant. Such termination of this Lease and repossession of the Premises shall be without prejudice to any remedies which Landlord

might otherwise have for arrears of rent or for a prior breach of the provisions of this Lease. Tenant waives any statutory notice to quit and equitable rights in the nature of further cure or redemption, and Tenant agrees that upon Landlord's termination of this Lease Landlord shall be entitled to re-entry and possession in accordance with the terms hereof. Landlord may, without notice, store Tenant's personal property (and those of any person claiming under Tenant) at the expense and risk of Tenant or, if Landlord so elects, Landlord may sell such personal property at public auction or auctions or at private sale or sales after seven days' notice to Tenant and apply the net proceeds to the earliest of installments of rent or other charges owing Landlord. Tenant agrees that a notice by Landlord alleging any default shall, at Landlord's option (the exercise of such option shall be indicated by the inclusion of the words "notice to quit" in such notice), constitute a statutory notice to quit. If Landlord exercises its option to designate a notice of default hereunder as a statutory notice to quit, any grace periods provided for herein shall run concurrently with any statutory notice periods.

19.2.2 In the case of termination of this Lease pursuant to Section 19.2.1, Tenant shall reimburse Landlord for all expenses arising out of such termination, including without limitation, all reasonable costs incurred in collecting amounts due from Tenant under this Lease (including reasonable attorneys' fees, costs of litigation and the like); all expenses incurred by Landlord in attempting to relet the Premises or parts thereof (including advertisements, brokerage commissions, Tenant's allowances, costs of preparing space, and the like); and all Landlord's other reasonable expenditures necessitated by the termination. The reimbursement from Tenant shall be due and payable immediately from time to time upon notice from Landlord that an expense has been incurred, without regard to whether the expense was incurred before or after the termination.

19.2.3 Landlord may elect by written notice to Tenant within one year following such termination to be indemnified for loss of rent by a lump sum payment representing the then present value of the amount of Rent that would have been paid in accordance with this Lease for the remainder of the Lease Term minus the then present value of the aggregate fair market rent and additional charges payable for the Premises for the remainder of the Lease Term (if less than the Rent payable hereunder), estimated as of the date of the termination, and taking into account reasonable projections of vacancy and time required to re-lease the Premises. (For the purposes of calculating the Rent that would have been paid hereunder for the lump sum payment calculation described herein, the last full year's Additional Rent under Article 4 is to be deemed constant for each year thereafter. The Federal Reserve discount rate (or equivalent) shall be used in calculating present values.) Should the parties be unable to agree on a fair market rent, the matter shall be submitted, upon the demand of either party, to the Charlotte, North Carolina office of the American Arbitration Association, with a request for arbitration in accordance with the rules of the Association by a single arbitrator who shall be an MAI appraiser with at least ten years' experience as an appraiser of life sciences buildings in the Research Triangle Park and Durham markets. The parties agree that a decision of the arbitrator shall be conclusive and binding upon them. If, at the end of the Lease Term, the rent that Landlord has actually received from the Premises is less than the aggregate fair market rent estimated as aforesaid, Tenant shall thereupon pay Landlord the amount of such difference. If and for so long as Landlord does not make the election provided for in this Section 19.2.3, Tenant shall indemnify Landlord for the loss of Rent by a payment at the end of each month which would have been included in the Lease Term, representing the excess of the Rent that would have been paid in accordance with this Lease (Base Rent together with any Additional Rent that would have been payable under Article 4, to be ascertained monthly) over the rent actually derived from the Premises by Landlord for such month (the amount of rent deemed derived shall be the actual amount less any portion thereof attributable to Landlord's reletting expenses described in Section 19.2.2 that have not been reimbursed by Tenant thereunder).

19.2.4 Intentionally Omitted.

19.2.5 In lieu of any other damages or indemnity and in lieu of full recovery by Landlord of all sums payable under all the foregoing provisions of this Section 19.2, Landlord may by written notice to Tenant within six (6) months after termination under any of the provisions contained in Section 19.1 and before such full recovery, elect to recover, and Tenant shall thereupon pay, as minimum liquidated damages under this Section 19.2, an amount equal to the lesser of (i) the aggregate of the Base Rent and Additional Rent for the balance of the Lease Term had it not been terminated or (ii) the aggregate thereof for the 12 months ending one year after the termination date, plus in either case (iii) the amount of Base Rent and Additional Rent of any kind accrued and unpaid at the time of termination and minus (iv) the amount of any recovery by Landlord under the foregoing provisions of this Section 19.2 up to the time of payment of such liquidated damages (but reduced by any amounts of reimbursement under Section 19.2.2). Liquidated damages hereunder shall not be in lieu of any claims for reimbursement under Section 19.2.2.

19.2.6 If Landlord does not elect to terminate this Lease on account of any default by Tenant, Landlord may, from time to time, without terminating this Lease, enforce all of its rights and remedies under this Lease, including the right to recover all rent as it becomes due.

19.2.7 Landlord shall at all times have the rights and remedies (which shall be cumulative with each other and cumulative and in addition to those rights and remedies available under Sections 19.2.1 and 19.2.2, above, or any law or other provision of this Lease), without prior demand or notice except as required by Applicable Law, to seek any declaratory, injunctive or other equitable relief, and specifically enforce this Lease, or restrain or enjoin a violation or breach of any provision hereof. The provisions of this Section 19.2.7 are not dependent upon the occurrence of a default.

19.2.8 Any obligation imposed by law upon Landlord to relet the Premises after any termination of the Lease shall be subject to the reasonable requirements of Landlord to lease to high quality tenants on such terms as Landlord may from time to time deem reasonably appropriate and to develop the Building in a harmonious manner with an appropriate mix of uses, tenants, floor areas and terms of tenancies, and the like, and Landlord shall not be obligated to relet the Premises to any party to whom Landlord or its affiliate may desire to lease other available space in the Building.

19.2.9 Nothing herein shall limit or prejudice the right of Landlord to prove and obtain in a proceeding for bankruptcy, insolvency, arrangement or reorganization, by reason of the termination, an amount equal to the maximum allowed by a statute of law in effect at the time when, and governing the proceedings in which, the damages are to be proved, whether or not the amount is greater to, equal to, or less than the amount of the loss or damage which Landlord has suffered.

19.3 **Subleases of Tenant**. Whether or not Landlord elects to terminate this Lease on account of any default by Tenant, as set forth in this Article 19, Landlord shall have the right to terminate any and all subleases, licenses, concessions or other consensual arrangements for possession entered into by Tenant and affecting the Premises or may, in Landlord's sole discretion, succeed to Tenant's interest in such subleases, licenses, concessions or arrangements. In the event of Landlord's election to succeed to Tenant's interest in any such subleases, licenses, concessions or arrangements, Tenant shall, as of the date of notice by Landlord of such election, have no further right to or interest in the rent or other consideration receivable thereunder.

19.4 **Efforts to Relet**. No re-entry or repossession, repairs, maintenance, changes, alterations and additions, reletting, appointment of a receiver to protect Landlord's interests hereunder, or any other action or omission by Landlord shall be construed as an election by Landlord to terminate this Lease or Tenant's right to possession, or to accept a surrender of the Premises, nor shall same operate to release Tenant in whole or in part from any of Tenant's obligations hereunder, unless express written notice of such intention is sent by Landlord to Tenant. Tenant hereby irrevocably waives any right otherwise available under any law to redeem or reinstate this Lease.

19.5 **Landlord Default**.

19.5.1 **General**. Notwithstanding anything to the contrary set forth in this Lease, Landlord shall not be in default in the performance of any obligation required to be performed by Landlord pursuant to this Lease unless Landlord fails to perform such obligation within thirty (30) days after the receipt of notice from Tenant specifying in detail Landlord's failure to perform; provided, however, if the nature of Landlord's obligation is such that more than thirty (30) days are required for its performance, then Landlord shall not be in default under this Lease if it shall commence such performance within such thirty (30) day period and thereafter diligently pursue the same to completion. Upon any such default by Landlord under this Lease, Tenant may, except as otherwise specifically provided in this Lease to the contrary, exercise any of its rights provided at law or in equity.

19.5.2 **Intentionally Omitted**.

20. COVENANT OF QUIET ENJOYMENT

Landlord covenants that Tenant, on paying the Rent, charges for services and other payments herein reserved and on keeping, observing and performing all the other terms, covenants, conditions, provisions and agreements herein contained on the part of Tenant to be kept, observed and performed, shall, during the Lease Term, peaceably and quietly have, hold and enjoy the Premises subject to the terms, covenants, conditions, provisions and agreements hereof without interference by any persons lawfully claiming by or through Landlord. The foregoing covenant is in lieu of any other covenant express or implied.

21. SECURITY DEPOSIT

Concurrently with Tenant's execution and delivery of this Lease, Tenant shall deposit with Landlord cash in the amount set forth in Section 9 of the Summary as security for the faithful performance by Tenant of all of its obligations under this Lease. The Security Deposit shall be held by Landlord as security for the faithful performance by Tenant of all of the terms, covenants and conditions of this Lease to be kept and performed by Tenant during the period commencing on the Execution Date and ending upon the expiration or termination of Tenant's obligations under this Lease. After an Event of Default Landlord may (but shall not be required to) use, apply or retain all or any part of the Security Deposit for the payment of any Rent or any other sum in default, or to compensate Landlord for any other loss or damage that Landlord may suffer by reason of Tenant's default as provided in this Lease. The provisions of this Article shall survive the expiration or earlier termination of this Lease. In the event of bankruptcy or other debtor-creditor proceedings against Tenant, the Security Deposit then being held by Landlord shall be deemed to be applied first to the payment of Rent and other charges due Landlord for all periods prior to the filing of such proceedings. Landlord shall deliver or credit to any purchaser of Landlord's interest in the Premises the funds then held hereunder by Landlord, and thereupon (and upon confirmation by the transferee of such funds, whether expressly or by written assumption of this Lease, generally) Landlord shall be discharged from any further liability with respect to such funds. This provision shall also apply to any subsequent transfers. If Tenant shall fully and faithfully perform every provision of this Lease to be performed by it, then the Security Deposit, if any, or any balance thereof, shall be returned to Tenant (or, at Landlord's option, to the last assignee of Tenant's interest hereunder) within 90 days after the expiration or earlier termination of this Lease. Landlord shall hold the Security Deposit in an account at a banking organization selected by Landlord; provided, however, that Landlord shall not be required to maintain a separate account for the Security Deposit, but may intermingle it with other funds of Landlord. Landlord shall be entitled to all interest and/or dividends, if any, accruing on such Security Deposit.

22. SUBSTITUTION OF OTHER PREMISES

Intentionally omitted.

23. SIGNS

23.1 **Interior Signage**. All letters and numerals on doors or other signs on the Premises shall be in the standard form of graphics for the Building, and no others shall be used or permitted without Landlord's prior written consent, not to be unreasonably withheld, conditioned, or delayed. Furthermore, Tenant shall not place signs on or in the Premises which are visible from outside the Premises. Tenant's name and suite number shall be included by Landlord on the lobby directory for the Building, at Landlord's cost.

23.2 **Intentionally omitted**.

23.3 **Prohibited Signage and Other Items**. Any signs, notices, logos, pictures, names or advertisements which are installed and that have not been separately approved by Landlord may be removed without notice by Landlord at the sole expense of Tenant. Tenant may not install any signs on the exterior or roof of the Project or the Common Areas. Any signs, window coverings, or blinds (even if the same are located behind the Landlord-approved window coverings for the Building), or other items visible from the exterior of the Premises or Building, shall be subject to the prior approval of Landlord, in its sole discretion. Tenant shall not place or install any projections, antennae, aerials, or similar devices inside or outside of the Building, without the prior written approval of Landlord (not to be unreasonably withheld, conditioned, or delayed), subject to Tenant's rights pursuant to Section 23.1, above.

24. COMPLIANCE WITH LAW

Tenant shall not do anything or suffer anything to be done in or about the Premises or the Project which will conflict with any law, statute, ordinance or other governmental rule, regulation or requirement now in force or which may hereafter be enacted or promulgated (collectively, "**Applicable Laws**"). At its sole cost and expense, Tenant shall promptly comply with all such Applicable Laws which relate to (i) Tenant's use of the Premises, (ii) any Alterations or Tenant Improvements, or (iii) the Building, but as to the Building (and as to any improvements to exterior walls, structural floors and the portions of the electrical, heating, ventilation and air conditioning and other systems of the Building that serve other tenants and that are located within the Premises), only to the extent such obligations are triggered by Alterations or Tenant Improvements, or Tenant's use of the Premises for non-general office and laboratory use. Tenant shall be responsible, at its sole cost and expense, to make all alterations to the Premises as are required to comply with the Applicable Laws to the extent required in this Article 24. Notwithstanding the foregoing terms of this Article 24 to the contrary, Tenant may defer such compliance with Applicable Laws while Tenant contests, in a court of proper jurisdiction, in good faith, the applicability of such Applicable Laws to the Premises or Tenant's specific use or occupancy of the Premises; provided, however, Tenant may only defer such compliance if such deferral shall not (a) prohibit Tenant from obtaining or maintaining a certificate of occupancy for the Premises, (b) prohibit Landlord from obtaining or maintaining a certificate of occupancy for the Building or any portion thereof, (c) unreasonably and materially affect the safety of the employees and/or invitees of Landlord or of any tenant in the Building (including Tenant), (d) create a significant health hazard for the employees and/or invitees of Landlord or of any tenant in the Building (including Tenant), (e) otherwise materially and adversely affect Tenant's use of or access to the Buildings or the Premises, or (f) impose material obligations, liability, fines, or penalties upon Landlord or any other tenant of the Building, or would materially and adversely affect the use of or access to the Building by Landlord or other tenants or invitees of the Building. The judgment of any court of competent jurisdiction or the admission of Tenant in any judicial action, regardless of whether Landlord is a party thereto, that Tenant has violated any of said governmental measures, shall be conclusive of that fact as between Landlord and Tenant. Landlord shall comply with all Applicable Laws relating to the Base Building and the Common Areas, provided that compliance with such Applicable Laws is not the responsibility of Tenant under this Lease, and provided further that Landlord's failure to comply therewith would prohibit Tenant from obtaining or maintaining a certificate of occupancy for the Premises, or would unreasonably and materially affect the safety of Tenant's employees or create a significant health hazard for Tenant's employees, or would otherwise materially and adversely affect Tenant's use of or access to the Premises. Landlord shall be permitted to include in Operating Expenses any costs or expenses incurred by Landlord under this Article 24 to the extent not prohibited by the terms of Section 4.2.7 above.

25. LATE CHARGES

If any installment of Rent or any other sum due from Tenant shall not be received by Landlord or Landlord's designee within five (5) business days after Tenant's receipt of written notice from Landlord that said amount is due, then Tenant shall pay to Landlord a late charge equal to five percent (5%) of the overdue amount plus any reasonable attorneys' fees incurred by Landlord by reason of Tenant's failure to pay Rent and/or other charges when due hereunder. Notwithstanding the foregoing, Landlord shall not charge Tenant a late charge for the first (1st) late payment in any twelve (12) month period (but in no event with respect to any subsequent late payment in any twelve (12) month period) during the Lease Term that Tenant fails to timely pay Rent or another sum due under this Lease, provided that such late payment is made within three (3) days following the expiration of the five (5) business day period set forth in the first sentence of this Article 25. The late charge shall be deemed Additional Rent and the right to require it shall be in addition to all of Landlord's other rights and remedies hereunder or at law and shall not be construed as liquidated damages or as limiting Landlord's remedies in any manner. In addition to the late charge described above, any Rent or other amounts owing hereunder which are not paid when due shall bear interest from the date when due until paid at a rate per annum equal to the lesser of (i) the annual "**Bank Prime Loan**" rate cited in the Federal Reserve Statistical Release Publication G.13(415), published on the first Tuesday of each calendar month (or such other comparable index as Landlord and Tenant shall reasonably agree upon if such rate ceases to be published) plus four (4) percentage points, and (ii) the highest rate permitted by Applicable Law.

26. LANDLORD'S RIGHT TO CURE DEFAULT; PAYMENTS BY TENANT

26.1 **Landlord's Cure**. All covenants and agreements to be kept or performed by Tenant under this Lease shall be performed by Tenant at Tenant's sole cost and expense and without any reduction of Rent, except to

the extent, if any, otherwise expressly provided herein. If Tenant shall fail to perform any obligation under this Lease, and such failure shall continue after notice in excess of the time allowed under Section 19.1.2, above, unless a specific time period is otherwise stated in this Lease, Landlord may, but shall not be obligated to, make any such payment or perform any such act on Tenant's part without waiving its rights based upon any default of Tenant and without releasing Tenant from any obligations hereunder.

26.2 **Tenant's Reimbursement**. Except as may be specifically provided to the contrary in this Lease, Tenant shall pay to Landlord, upon delivery by Landlord to Tenant of statements therefor: (i) sums equal to expenditures reasonably made and obligations incurred by Landlord in connection with the remedying by Landlord of Tenant's defaults pursuant to the provisions of Section 26.1; (ii) sums equal to all losses, costs, liabilities, damages and expenses referred to in Article 10 of this Lease; and (iii) sums equal to all expenditures made and obligations incurred by Landlord in collecting or attempting to collect the Rent or in enforcing or attempting to enforce any rights of Landlord under this Lease or pursuant to law, including, without limitation, all reasonable legal fees and other amounts so expended. Tenant's obligations under this Section 26.2 shall survive the expiration or sooner termination of the Lease Term.

27. ENTRY BY LANDLORD

Provided, however, that any such entry by Landlord shall (i) remain subject to Tenant's reasonable security and privacy measures; and (ii) not unreasonably interfere with Tenant's use and occupancy of the Premises, or the conduct of its business therein, then Landlord reserves the right at all reasonable times and upon not less than one (1) day's prior written (e-mail is acceptable) notice to Tenant (except in the case of an emergency) to enter the Premises to (i) inspect them; (ii) show the Premises to prospective purchasers, or to current or prospective mortgagees, ground or underlying lessors or insurers or, during the last nine (9) months of the Lease Term, to prospective tenants; (iii) post notices of nonresponsibility (to the extent applicable pursuant to then Applicable Law); or (iv) alter, improve or repair the Premises or the Building, or for structural alterations, repairs or improvements to the Building or the Building's systems and equipment. Provided that Landlord employs commercially reasonable efforts to minimize interference with the conduct of Tenant's business in connection with entries into the Premises, Landlord may make any such entries without the abatement of Rent, except as otherwise provided in this Lease, and shall take such reasonable steps as required to accomplish the stated purposes. In an emergency, Landlord shall have the right to use any means that Landlord may deem proper to open the doors in and to the Premises. Any entry into the Premises by Landlord in the manner hereinbefore described shall not be deemed to be a forcible or unlawful entry into, or a detainer of, the Premises, or an actual or constructive eviction of Tenant from any portion of the Premises.

28. TENANT PARKING

Tenant shall have the right, without the payment of any parking charge or fee (other than as a reimbursement of operating expenses to the extent allowed pursuant to the terms of Article 4 of this Lease, above), commencing on the Lease Commencement Date, to use the amount of unreserved parking spaces set forth in Section 10 of the Summary, on a monthly basis throughout the Lease Term, which parking spaces shall pertain to the on-site and/or off-site, as the case may be, parking facility (or facilities) which serve the Project. Notwithstanding the foregoing, Tenant shall be responsible for the full amount of any taxes imposed by any governmental authority in connection with the renting of such parking spaces by Tenant or the use of the parking facility by Tenant. Tenant's continued right to use the parking spaces is conditioned upon Tenant abiding by all rules and regulations which are prescribed from time to time for the orderly operation and use of the parking facility where the parking spaces are located (including any sticker or other identification system established by Landlord and the prohibition of vehicle repair and maintenance activities in the parking facilities), and shall reasonably cooperate in seeing that Tenant's employees and visitors also comply with such rules and regulations. Tenant's use of the Project parking facility shall be at Tenant's sole risk and Tenant acknowledges and agrees that Landlord shall have no liability whatsoever for damage to the vehicles of Tenant, its employees and/or visitors, or for other personal injury or property damage or theft relating to or connected with the parking rights granted herein or any of Tenant's, its employees' and/or visitors' use of the parking facilities.

29. MISCELLANEOUS PROVISIONS

29.1 **Terms; Captions**. The words "**Landlord**" and "**Tenant**" as used herein shall include the plural as well as the singular. The necessary grammatical changes required to make the provisions hereof apply either to

corporations or partnerships or individuals, men or women, as the case may require, shall in all cases be assumed as though in each case fully expressed. The captions of Articles and Sections are for convenience only and shall not be deemed to limit, construe, affect or alter the meaning of such Articles and Sections.

29.2 **Binding Effect**. Subject to all other provisions of this Lease, each of the covenants, conditions and provisions of this Lease shall extend to and shall, as the case may require, bind or inure to the benefit not only of Landlord and of Tenant, but also of their respective heirs, personal representatives, successors or assigns, provided this clause shall not permit any assignment by Tenant contrary to the provisions of Article 14 of this Lease.

29.3 **No Air Rights**. No rights to any view or to light or air over any property, whether belonging to Landlord or any other person, are granted to Tenant by this Lease. If at any time any windows of the Premises are temporarily darkened or the light or view therefrom is obstructed by reason of any repairs, improvements, maintenance or cleaning in or about the Project, the same shall be without liability to Landlord and without any reduction or diminution of Tenant's obligations under this Lease.

29.4 **Modification of Lease**. Should any current or prospective mortgagee or ground lessor for the Building or Project require a modification of this Lease, which modification will not cause an increased cost or expense to Tenant or in any other way materially and adversely change the rights and obligations of Tenant hereunder, then and in such event, Tenant agrees that this Lease may be so modified and agrees to execute whatever documents are reasonably required therefor and to deliver the same to Landlord within ten (10) business days following a request therefor. At the request of Landlord or any mortgagee or ground lessor, Tenant agrees to execute a short form of Lease and deliver the same to Landlord within ten (10) business days following the request therefor.

29.5 **Transfer of Landlord's Interest**. Tenant acknowledges that Landlord has the right to transfer all or any portion of its interest in the Project or Building and in this Lease, and Tenant agrees that in the event of any such transfer, Landlord shall automatically be released from all liability under this Lease and Tenant agrees to look solely to such transferee for the performance of Landlord's obligations hereunder after the date of transfer and such transferee shall be deemed to have fully assumed and be liable for all obligations of this Lease to be performed by Landlord, including the return of any Security Deposit, and Tenant shall attorn to such transferee.

29.6 **Prohibition Against Recording**. In the event this Lease, a copy or any notice or memorandum thereof shall be recorded by Tenant without Landlord's consent, then such recording shall constitute a default by Tenant under Article 19 hereof entitling Landlord to immediately terminate this Lease. At the request of either Landlord or Tenant, the parties shall execute a memorandum of lease in recordable form containing such information as is necessary to constitute a notice of lease under North Carolina law. All costs of preparation and recording such notice shall be borne by the party requesting the memorandum. At the expiration or earlier termination of this Lease, Tenant shall provide Landlord with an executed termination of the memorandum in recordable form, which obligation shall survive such expiration or earlier termination.

29.7 **Landlord's Title**. Landlord's title is and always shall be paramount to the title of Tenant. Nothing herein contained shall empower Tenant to do any act which can, shall or may encumber the title of Landlord.

29.8 **Relationship of Parties**. Nothing contained in this Lease shall be deemed or construed by the parties hereto or by any third party to create the relationship of principal and agent, partnership, joint venturer or any association between Landlord and Tenant.

29.9 **Application of Payments**. Landlord shall have the right to apply payments received from Tenant pursuant to this Lease, regardless of Tenant's designation of such payments, to satisfy any obligations of Tenant hereunder, in such order and amounts as Landlord, in its sole discretion, may elect.

29.10 **Time of Essence**. Time is of the essence with respect to the performance of every provision of this Lease in which time of performance is a factor.

29.11 **Partial Invalidity**. If any term, provision or condition contained in this Lease shall, to any extent, be invalid or unenforceable, the remainder of this Lease, or the application of such term, provision or condition to

persons or circumstances other than those with respect to which it is invalid or unenforceable, shall not be affected thereby, and each and every other term, provision and condition of this Lease shall be valid and enforceable to the fullest extent possible permitted by law.

29.12 **No Warranty**. In executing and delivering this Lease, Tenant has not relied on any representations, including, but not limited to, any representation as to the amount of any item comprising Additional Rent or the amount of the Additional Rent in the aggregate or that Landlord is furnishing the same services to other tenants, at all, on the same level or on the same basis, or any warranty or any statement of Landlord which is not set forth herein or in one or more of the exhibits attached hereto.

29.13 **Landlord Exculpation**. The liability of Landlord or the Landlord Parties to Tenant for any default by Landlord under this Lease or arising in connection herewith or with Landlord's operation, management, leasing, repair, renovation, alteration or any other matter relating to the Project or the Premises shall be limited solely and exclusively to an amount which is equal to the interest of Landlord in the Building (including rental income and insurance/condemnation proceeds). Neither Landlord, nor any of the Landlord Parties shall have any personal liability therefor, and Tenant hereby expressly waives and releases such personal liability on behalf of itself and all persons claiming by, through or under Tenant. The limitations of liability contained in this Section 29.13 shall inure to the benefit of Landlord's and the Landlord Parties' present and future partners, beneficiaries, officers, directors, trustees, shareholders, agents and employees, and their respective partners, heirs, successors and assigns. Under no circumstances shall any present or future partner of Landlord (if Landlord is a partnership), or trustee or beneficiary (if Landlord or any partner of Landlord is a trust), have any liability for the performance of Landlord's obligations under this Lease. Notwithstanding any contrary provision herein, neither Landlord nor the Landlord Parties, not Tenant (except with respect to any holdover tenancy) shall be liable under any circumstances for consequential or indirect damages, including without limitation injury or damage to, or interference with, Tenant's business, including but not limited to, loss of profits, loss of rents or other revenues, loss of business opportunity, loss of goodwill or loss of use, in each case, however occurring.

29.14 **Entire Agreement**. It is understood and acknowledged that there are no oral agreements between the parties hereto affecting this Lease and this Lease constitutes the parties' entire agreement with respect to the leasing of the Premises and supersedes and cancels any and all previous negotiations, arrangements, brochures, agreements and understandings, if any, between the parties hereto or displayed by Landlord to Tenant with respect to the subject matter thereof, and none thereof shall be used to interpret or construe this Lease. None of the terms, covenants, conditions or provisions of this Lease can be modified, deleted or added to except in writing signed by the parties hereto.

29.15 **Right to Lease**. Landlord reserves the absolute right to effect such other tenancies in the Project as Landlord in the exercise of its sole business judgment shall determine to best promote the interests of the Building or Project. Tenant does not rely on the fact, nor does Landlord represent, that any specific tenant or type or number of tenants shall, during the Lease Term, occupy any space in the Building or Project.

29.16 **Force Majeure**. Any prevention, delay or stoppage due to strikes, lockouts, labor disputes, acts of God, acts of war, terrorist acts, governmental action or inaction, inability to obtain services, labor, or materials or reasonable substitutes therefor, governmental actions, civil commotions, fire or other casualty, and other causes beyond the reasonable control of the party obligated to perform, except with respect to the obligations imposed with regard to Rent and other charges to be paid by Tenant pursuant to this Lease (collectively, a "**Force Majeure**"), notwithstanding anything to the contrary contained in this Lease, shall excuse the performance of such party for a period equal to any such prevention, delay or stoppage and, therefore, if this Lease specifies a time period for performance of an obligation of either party, that time period shall be extended by the period of any delay in such party's performance caused by a Force Majeure.

29.17 **Waiver of Redemption by Tenant**. Tenant hereby waives, for Tenant and for all those claiming under Tenant, any and all rights now or hereafter existing to redeem by order or judgment of any court or by any legal process or writ, Tenant's right of occupancy of the Premises after any termination of this Lease.

29.18 **Notices**. All notices, demands, statements, designations, approvals or other communications (collectively, "**Notices**") given or required to be given by either party to the other hereunder or by law shall be in writing, shall be (A) sent by United States certified or registered mail, postage prepaid, return receipt requested ("**Mail**"), (B) delivered by a nationally recognized overnight courier, or (D) delivered personally. Any Notice shall be sent, transmitted, or delivered, as the case may be, to Tenant at the appropriate address set forth in Section 11 of the Summary, or to such other place as Tenant may from time to time designate in a Notice to Landlord, or to Landlord at the addresses set forth below, or to such other places as Landlord may from time to time designate in a Notice to Tenant. Any Notice will be deemed given (i) upon receipt or refusal, (ii) the date the overnight courier delivery is made, or (iii) the date personal delivery is made. As of the date of this Lease, any Notices to Landlord must be sent, transmitted, or delivered, as the case may be, to the following addresses:

DURHAM TW ALEXANDER, LLC
c/o Longfellow Real Estate Partners
260 Franklin Street, Suite 1920
Boston, MA 02110
Attention: Asset Management

And

David E. Wagner
K&L Gates LLP
4350 Lassiter at North Hills Avenue
Suite 300 (27609)
Post Office Box 17047
Raleigh, North Carolina 27619-7047

29.19 **Joint and Several**. If there is more than one Tenant, the obligations imposed upon Tenant under this Lease shall be joint and several.

29.20 **Authority**. Landlord and Tenant each hereby represents and warrants that it is a duly formed and existing entity qualified to do business in the State of North Carolina and that said party has full right and authority to execute and deliver this Lease and that each person signing on behalf of said party is authorized to do so.

29.21 **Attorneys' Fees**. In the event that either Landlord or Tenant should bring suit for the possession of the Premises, for the recovery of any sum due under this Lease, or because of the breach of any provision of this Lease or for any other relief against the other, then all costs and expenses, including reasonable attorneys' fees, incurred by the prevailing party therein shall be paid by the other party, which obligation on the part of the other party shall be deemed to have accrued on the date of the commencement of such action and shall be enforceable whether or not the action is prosecuted to judgment.

29.22 **Governing Law; WAIVER OF TRIAL BY JURY**. This Lease shall be construed and enforced in accordance with the laws of the State of North Carolina. Landlord and Tenant waive trial by jury in any action to which they are parties, and further agree that any action arising out of this Lease (except an action for possession by Landlord, which may be brought in whatever manner or place provided by law) shall be brought in the Trial Court, Superior Court Department, in the county where the Premises are located.

29.23 **Submission of Lease**. Submission of this instrument for examination or signature by Tenant does not constitute a reservation of, option for or option to lease, and it is not effective as a lease or otherwise until execution and delivery by both Landlord and Tenant.

29.24 **Brokers**. Landlord and Tenant hereby warrant to each other that it has had no dealings with any real estate broker or agent in connection with the negotiation of this Lease, excepting only the real estate brokers or agents specified in Section 13 of the Summary (the "**Brokers**"), and that it knows of no other real estate broker or agent which represented said party who is entitled to a commission in connection with this Lease. Landlord and Tenant each agree to indemnify and defend each other against and hold the indemnified party harmless from any and all claims, demands, losses, liabilities, lawsuits, judgments, costs and expenses (including without limitation reasonable attorneys' fees) with respect to any leasing commission or equivalent compensation alleged to be owing on account of any dealings with any real estate broker or agent, other than the Brokers, occurring by, through, or under

the indemnifying party. The terms of this Section 29.24 shall survive the expiration or earlier termination of the Lease Term.

29.25 **Independent Covenants**. This Lease shall be construed as though the covenants herein between Landlord and Tenant are independent and not dependent and Tenant hereby expressly waives the benefit of any statute to the contrary and agrees that if Landlord fails to perform its obligations set forth herein, Tenant shall not be entitled to make any repairs or perform any acts hereunder at Landlord's expense or to any setoff of the Rent or other amounts owing hereunder against Landlord.

29.26 **Project or Building Name, Address and Signage**. Landlord shall have the right at any time to change the name and/or address of the Project or Building and to install, affix and maintain any and all signs on the exterior and on the interior of the Project or Building as Landlord may, in Landlord's sole discretion, desire. Tenant shall not use the name of the Project or Building or use pictures or illustrations of the Project or Building in advertising or other publicity or for any purpose other than as the address of the business to be conducted by Tenant in the Premises, without the prior written consent of Landlord.

29.27 **Counterparts**. This Lease may be executed in counterparts with the same effect as if both parties hereto had executed the same document. Both counterparts shall be construed together and shall constitute a single lease.

29.28 **Confidentiality**. Tenant acknowledges that the content of this Lease and any related documents are confidential information. Tenant shall keep such confidential information confidential and shall not disclose such confidential information to any person or entity other than Tenant's lawyers, accountants, auditors, agents, lenders, and prospective purchasers/investors for reasonable business purposes.

29.29 **Development of the Project**.

29.29.1 **Subdivision**. Landlord reserves the right to subdivide all or a portion of the buildings and Common Areas. Tenant agrees to execute and deliver, upon demand by Landlord and in the form requested by Landlord, any additional documents needed to conform this Lease to the circumstances resulting from a subdivision and any all maps in connection therewith. Notwithstanding anything to the contrary set forth in this Lease, the separate ownership of any buildings and/or Common Areas by an entity other than Landlord shall not affect the calculation of Direct Expenses or Tenant's payment of Tenant's Share of Direct Expenses.

29.29.2 **Construction of Property and Other Improvements**. Tenant acknowledges that portions of the Project and/or the Other Improvements may be under construction following Tenant's occupancy of the Premises, and that such construction may result in levels of noise, dust, obstruction of access, etc. which are in excess of that present in a fully constructed project. Tenant hereby waives any and all rent offsets or claims of constructive eviction which may arise in connection with such construction. Provided, however, that Landlord shall use good faith efforts to provide Tenant with fourteen (14) days' notice, which may be verbal, in advance of commencing any construction activities that Landlord anticipates could disrupt Tenant's use of the Premises, including a reasonable description of the scope of work to be performed and the anticipated duration of such activity. At all times Landlord shall use commercially reasonable efforts to minimize any disruption with the conduct of Tenant's business within the Premises. Upon request from Tenant Landlord will inform Tenant of the general construction schedule for any work adjacent to the Premises or which adversely affects access to the Premises.

29.30 **No Violation**. Landlord and Tenant each hereby warrant and represent that neither its execution of nor performance under this Lease shall cause said party to be in violation of any agreement, instrument, contract, law, rule or regulation by which said party is bound, and said party shall protect, defend, indemnify and hold the indemnified party harmless against any claims, demands, losses, damages, liabilities, costs and expenses, including, without limitation, reasonable attorneys' fees and costs, arising from the indemnifying party's breach of this warranty and representation.

29.31 **Communications and Computer Lines**. Tenant may install, maintain, replace, remove or use any communications or computer wires and cables serving the Premises (collectively, the "**Lines**"), provided that (i) Tenant shall obtain Landlord's prior written consent (which consent shall not be unreasonably withheld, conditioned or delayed), use an experienced and qualified contractor reasonably approved in writing by Landlord, and comply with all of the other provisions of Articles 7 and 8 of this Lease. Tenant shall pay all costs in connection therewith. Landlord reserves the right, upon notice to Tenant prior to the expiration or earlier termination of this Lease, to require that Tenant, at Tenant's sole cost and expense, remove any Lines located in or serving the Premises prior to the expiration or earlier termination of this Lease.

29.32 **Transportation Management**. Tenant shall reasonably comply with all present or future programs intended to manage parking, transportation or traffic in and around the Project and/or the Building, and in connection therewith, Tenant shall take responsible action for the transportation planning and management of all employees located at the Premises by working directly with Landlord, any governmental transportation management organization or any other transportation-related committees or entities. Such programs may include, without limitation: (i) restrictions on the number of peak-hour vehicle trips generated by Tenant; (ii) increased vehicle occupancy; (iii) implementation of an in-house ridesharing program and an employee transportation coordinator; (iv) working with employees and any Project, Building or area-wide ridesharing program manager; (v) instituting employer-sponsored incentives (financial or in-kind) to encourage employees to rideshare; and (vi) utilizing flexible work shifts for employees.

29.33 **Guarantor**. Intentionally omitted.

29.34 **REIT**. Tenant acknowledges that the Company, an affiliate of Landlord, elects to be taxed as a real estate investment trust (a "REIT") under the Code. Tenant hereby agrees to modifications of this Lease required to retain or clarify the Company's status as a REIT, provided such modifications: (a) are reasonable, (b) do not adversely affect in a material manner Tenant's use of the Premises as herein permitted, and (c) do not increase the Base Rent, Additional Rent and other sums to be paid by Tenant or Tenant's other obligations pursuant to this Lease, or reduce any rights of Tenant under this Lease, then Landlord may submit to Tenant an amendment to this Lease incorporating such required modifications, and Tenant shall execute, acknowledge and deliver such amendment to Landlord within ten (10) business days after Tenant's receipt thereof.

29.35 **Additional Storage**. Landlord shall provide Tenant with access to and use an exterior storage area as shown on **Exhibit I** ("**Storage Area**"). Tenant shall use the Storage Area in compliance with all Environmental Laws and in compliance with Section 5.4 of this Lease. Other tenants may utilize other portions of the structure or area in which the Storage Area is located, provided that Tenant shall always have access to no less than one-half of the capacity of the larger structure (as shown on **Exhibit I**). Tenant shall not exceed its share of any storage allocation applicable to the Storage Area, as reasonably determined by Landlord.

29.36 **Generator**. Subject to the provisions of this Section 29.36, Tenant shall be entitled to install, operate and maintain a generator and any other equipment related thereto, including, without limitation, a fuel system, wiring and shaft space ("**Generator**") next to the Building at Tenant's sole cost and expense (without paying any additional fee or rental to Landlord for the use thereof). Prior to the installation of the Generator, Tenant shall inspect the proposed location to determine a suitable location for the Generator, and Tenant shall submit written plans and specifications relative to the type, size and proposed location (including any proposed screening) of the Generator to Landlord for its review and written approval. Tenant shall be solely responsible for the cost of acquisition, installation, operation, and maintenance of the Generator; and Tenant shall install, maintain and operate the Generator in accordance with all federal, state, and local laws, statutes, ordinances, rules and regulations, including without limitation, obtaining and maintaining any and all permits, approvals and licenses required to install and operate the Generator by any governmental authority having jurisdiction. Landlord and Tenant agree that, upon the expiration of earlier termination of the Lease Term, Tenant shall not be required to remove the Generator, any associated cabling, wiring and screening or other improvements. Tenant shall not be entitled to grant or assign to any third party (other than a permitted assignee of Tenant's rights under the Lease or a permitted subtenant relative to the Premises (or a portion thereof)) the right to use the Generator without Landlord's prior written consent (which consent may be granted or withheld in Landlord's discretion). Upon reasonable advance notice to Tenant (and provided Landlord reasonably coordinates with Tenant and provides an alternate source of backup generator capacity during said transition), Landlord shall be entitled to cause the Generator to be moved to another location near the Building, at Landlord's cost and expense. Tenant shall pay all personal property taxes on the Generator. Tenant shall also pay any increases in the real property taxes of the Building due to the installation of the Generator within thirty (30) days of receipt of notice

from Landlord which includes proof of such increase in taxes. Tenant's indemnity obligations under Section 5.4.1.5 of the Lease, relating to the use of Hazardous Materials, shall apply to the use and operation of the Generator. Finally, Tenant's insurance obligations under Section 10.3 of the Lease shall apply to the Generator.

IN WITNESS WHEREOF, Landlord and Tenant have caused this Lease to be executed the day and date first above written.

LANDLORD:

DURHAM TW ALEXANDER, LLC,
a Delaware limited liability company

By: /s/ Jamison N. Peschel

Name: Jamison N. Peschel

Its: Authorized Signatory

By: _____

Name: _____

Its: _____

TENANT:

PRECISION BIOSCIENCES, INC.,
a Delaware corporation

By: /s/ Matt Kane

Name: Matt Kane

Its: CEO

By: _____

Name: _____

Its: _____

EXHIBIT A

BIOPOINT INNOVATION LABS

FIRST OFFER SPACE

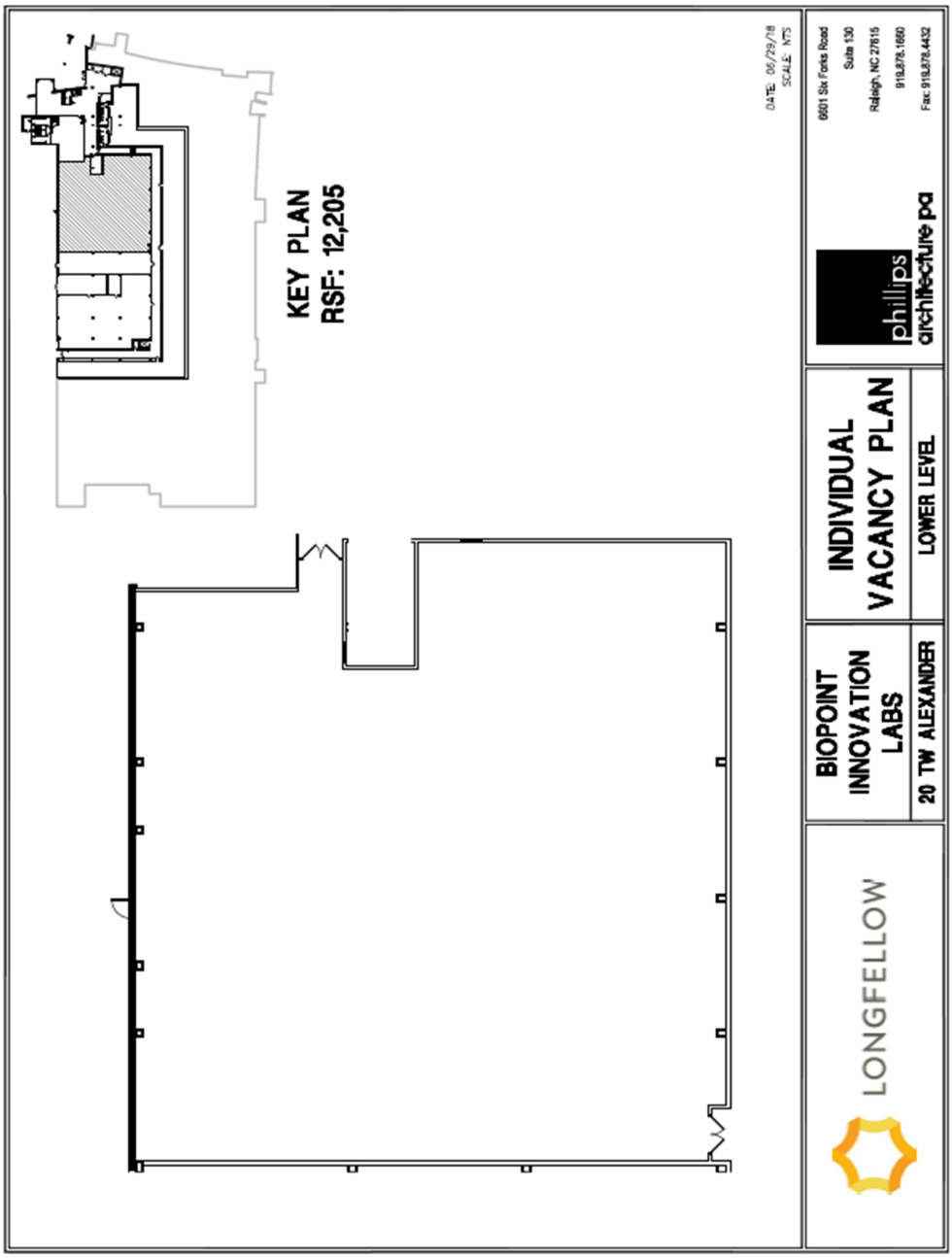


EXHIBIT B

NOTICE OF LEASE TERM DATES

To: _____
_____
_____
_____

Re: Lease dated _____, 20__ between _____, a _____ ("**Landlord**"), and _____, a _____ ("**Tenant**") concerning Suite _____ on floor(s) _____ of the office building located at **[INSERT BUILDING ADDRESS]**.

Gentlemen:

In accordance with the Lease (the "**Lease**"), we wish to advise you and/or confirm as follows:

1. The Lease Term shall commence on or has commenced on _____ for a term of _____ ending on _____.

2. Rent commenced to accrue on _____, in the amount of _____.

3. If the Lease Commencement Date is other than the first day of the month, the first billing will contain a pro rata adjustment. Each billing thereafter, with the exception of the final billing, shall be for the full amount of the monthly installment as provided for in the Lease.

4. Your rent checks should be made payable to _____ at _____.

5. The exact number of rentable/usable square feet within the Premises is _____ square feet.

6. Tenant's Share as adjusted based upon the exact number of usable square feet within the Premises is _____%.

"Landlord":

_____
a

By: _____
Its: _____

Agreed to and Accepted as
of _____, 20_____

"Tenant":

_____
a _____

By: _____
Its: _____

EXHIBIT C

PREMISES

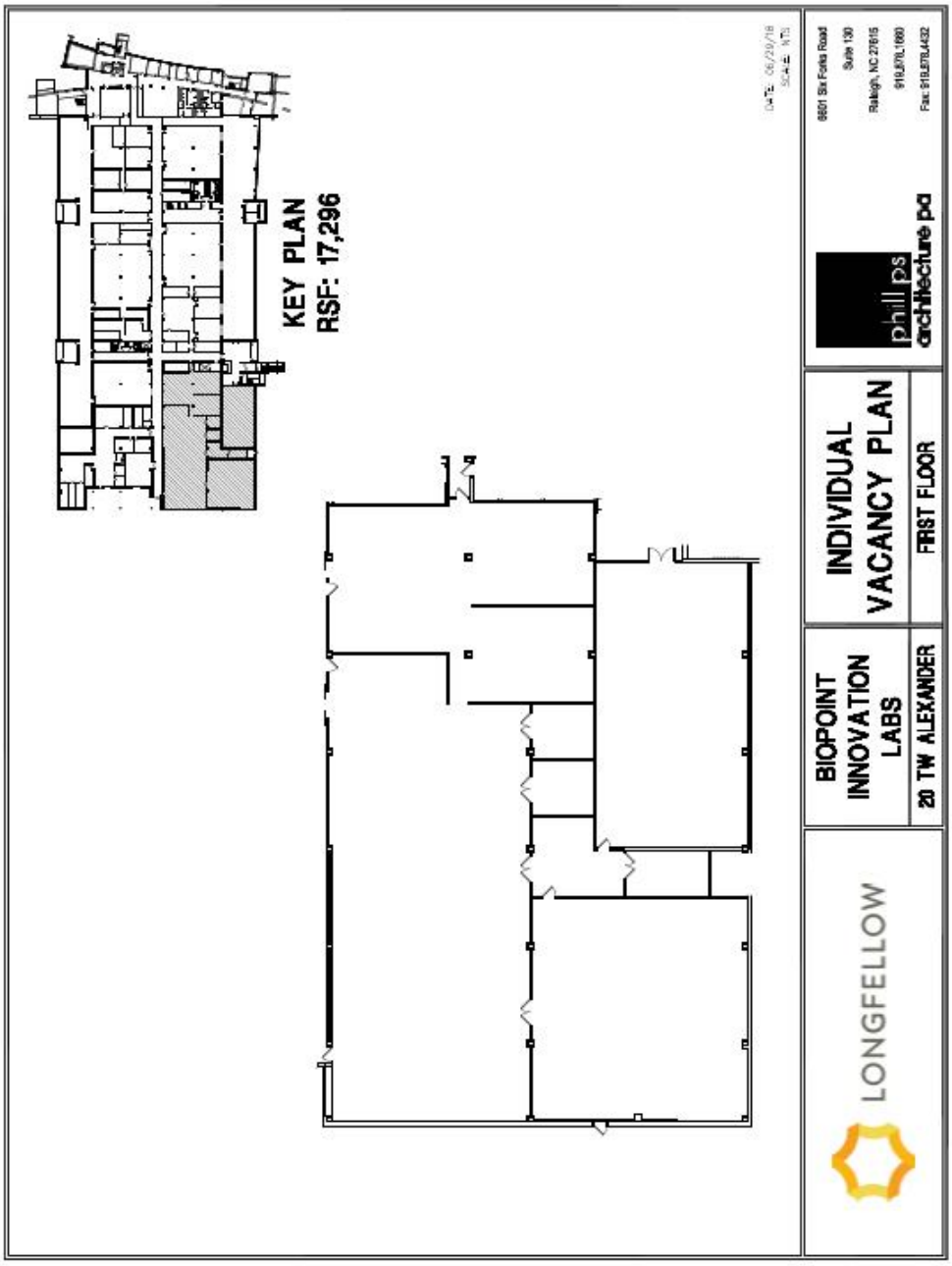


EXHIBIT D

TENANT WORK LETTER

This Tenant Work Letter sets forth the terms and conditions relating to the construction of the initial tenant improvements in the Premises. This Tenant Work Letter is essentially organized chronologically and addresses the issues of the construction of the Premises, in sequence, as such issues will arise during the actual construction of the Premises. All references in this Tenant Work Letter to Articles or Sections of "this Lease" shall mean the relevant portion of the Lease to which this Tenant Work Letter is attached as Exhibit D and of which this Tenant Work Letter forms a part, and all references in this Tenant Work Letter to Sections of "this Tenant Work Letter" shall mean the relevant portion of this Tenant Work Letter.

1. LANDLORD'S INITIAL CONSTRUCTION IN THE PREMISES

1.1 Landlord Work. Landlord shall, at Landlord's sole cost and expense, complete the work described on the attached Attachment 1 (collectively, the "Landlord Work"). The Landlord Work shall be performed in a first-class, workmanlike manner.

2. TENANT IMPROVEMENTS

2.1 Tenant Improvements Allowance. Tenant shall be entitled to a tenant improvement allowance (the "Tenant Improvements Allowance") in the maximum aggregate amount of **$1,220,720.00** (in a total amount equivolent to $70.58 per rentable square foot of the entire Premises initially leased hereunder) and adjusted based on the actual square footage) (the "Maximum Allowance Amount") for the hard costs and customary soft costs, as noted below, incurred by Tenant, including, without limitation, architectural and engineering fees, construction contractor fees, Tenant's project management fees, a 2% fee payable to Landlord or its affiliates for oversight and administrative costs related to the Tenant Improvements ("Landlord's Project Oversight Fee"), permits, and such other costs arising from or relating to the design and construction of Tenant's improvements which are to be permanently affixed to the Premises in accordance with this Work Letter (the "Tenant Improvements"). Landlord's Project Oversight Fee shall be equivolent to, but not exceed, a total of 2% of the Tenant Improvement Allowance paid to Tenant. For the avoidance of any doubt, the purchase and installation of data and telecommunications cabling shall not be included in the definition of Tenant Improvements and there shall not be any Landlord's Project Oversight Fee payable with respect to costs and expenses related thereto. Tenant agrees to keep the Landlord advised as to the progress of the work by providing copies of the Contractor's applications for payment. In no event shall Landlord be obligated to make disbursements pursuant to this Tenant Work Letter in a total amount which exceeds the Maximum Allowance Amount. All Tenant Improvements for which the Tenant Improvements Allowance has been used to pay shall be deemed Landlord's property under the terms of the Lease.

2.2 Disbursement of the Tenant Improvements Allowance. Except as otherwise set forth in this Tenant Work Letter, the Tenant Improvements Allowance shall be disbursed by Landlord (each of which disbursements shall be made pursuant to Landlord's reasonable disbursement process) for costs incurred by Tenant related to the design and construction of the Tenant Improvements and for the following items and costs (collectively, the "Tenant Improvements Allowance Items"): (i) payment of the fees of the "Architect" as that term is defined in Section 3.1 of this Tenant Work Letter in connection with the preparation and review of the "Construction Documents," as that term is defined in Section 3.1 of this Tenant Work Letter; (ii) payment of the Landlord's Project Oversight Fee, (iii) the cost of any changes to the Construction Documents or Tenant Improvements required by all applicable building codes (the "Code") enacted after approval of the Construction Documents, (iv) costs payable to the Contractor and any subcontractors, and (v) other costs incurred in connection with the Tenant Improvements to the extent the same can be paid using the Tenant Improvements Allowance pursuant to the specific provisions of this Tenant Work Letter.

Once Landlord is required to disburse any portion of the Tenant Improvement Allowance as noted herein, Landlord shall disburse the applicable portion of the Tenant Improvements Allowance within thirty (30) calendar days of receiving from Tenant a Payment Request (as hereinafter defined), an amount equal to the portion of the actual costs and expenses Tenant has incurred and paid in connection with the design and construction of the Tenant

Improvements to date, over the amount Tenant is required to pay as noted in Section 4.3.1, which are to be paid for from the Tenant Improvement Allowance provided the following conditions have been satisfied:

(1) Tenant has delivered to Landlord a payment request ("Payment Request") in a form reasonably satisfactory to Landlord specifying the work which has been completed; and

(2) Tenant's general contractor and/or architect shall have submitted an application for payment and sworn statement substantially in the form of AIA Document G702 and AIA Document G703; and

(3) Tenant has submitted to Landlord lien waivers or partial lien waivers from all contractors, first tier subcontractors, artchitects, and first tier materialmen who performed such work to cover the work included under the Payment Request and all prior work Tenant was required to pay for before utilizing the Tenant Improvements Allowance.

Notwithstanding anything herein to the contrary, the Tenant Improvements Allowance must be requested by Tenant, if at all, in accordance with this paragraph on or before the date that is one year following the Rent Commencement Date, and any portion not requested by such date may no longer be utilized by Tenant and shall be deemed forfeited to Landlord.

3. CONSTRUCTION DOCUMENTS

3.1 Selection of Architect/Construction Documents. Landlord consents to Tenant retaining Integrated Design, PA (the "Architect") to prepare the "Construction Documents," as that term is defined in this Section 3.1 for the Tenant Improvements, together with the consulting engineers selected by the Architect and reasonably approved by Landlord. Tenant is not obligated to retain Integrated Design, PA and may retain another Architect or Architects from time to time, provided, however, that any such other Architects shall be subject to Landlord's reasonable approval. The plans and drawings to be prepared by Architect hereunder shall be known collectively as the "Construction Documents." All Construction Documents shall reasonably comply with the drawing format and specifications as reasonably determined by Landlord, and shall be subject to Landlord's and Tenant's approval. Landlord may hire an architectural firm to conduct a peer review, and the fees associated with this peer review shall be paid from the Landlord's Project Oversight Fee and shall not result in an additional charge to Tenant.

Landlord has no obligation to approve any Tenant Change or any Tenant Improvements not shown on the plans previously approved by Landlord and Tenant or reasonably inferable therefrom if, in Landlord's reasonable judgment, such Tenant Improvements (i) would materially increase the cost of performing any other work in the Building, not including the Tenant Improvements, unless in each case Tenant agrees to pay such costs based on Landlord's Change Estimate Notice (as defined below), (ii) are incompatible with the design, quality, equipment or systems of the Building or otherwise require a change to the existing Building systems or structure, each in a manner that would not otherwise be required in connection with the improvements contemplated by the Fit Plan (as defined below), (iii) is not consistent with the existing quality and nature of the Building, or (iv) otherwise do not comply with the provisions of the Lease.

3.2 Final Space Plan. Landlord and Tenant have reviewed and approved the preliminary space plan prepared by the Architect attached as Attachment 3 hereto (the "Fit Plan"). Tenant shall use commercially reasonable efforts to cause the Architect to prepare a space plan for the Premises which space plan shall be reasonably consistent with the Fit Plan and shall include a layout and designation of all labs, offices, rooms and other partitioning, their intended use, and equipment to be contained therein, and shall deliver the space plan to Landlord and Tenant for their approval. Landlord and Tenant shall review and provide any changes to the space plan within five Business Days of receipt thereof. Once Landlord and Tenant approve the final space plan, the space plan shall be considered final (the "Final Space Plan").

3.3 Construction Documents. Tenant shall cause the Architect to complete final Construction Documents consistent with the Final Space Plan and shall submit the same to Landlord and Tenant for their approval. Landlord and Tenant shall review and provide any changes to the construction documents within five (5) Business Days of receipt thereof, and the Tenant shall use reasonable efforts to cause the Architect to prepare and circulate

modified documents within ten (10) Business Days of its receipt of any requested changes from Tenant or Landlord. Such process of submittal and response within the time frame specified in the preceding sentence shall continue until each of Landlord and Tenant gives written approval to such documents, and the Construction Documents shall be considered final once approved by the Landlord and the Tenant. In no event may either Tenant or Landlord require any changes that are inconsistent with the Final Space Plan. The Construction Documents shall comply with Applicable Laws existing on the date of this Tenant Work Letter and which may be enacted prior to approval of completed Construction Documents. Subject to the provisions of Sections 3.1 and 5.4 of this Work Letter, Tenant may, from time to time, by written request to Landlord on a form reasonably specified by Landlord ("Tenant Change"), request a change in the Tenant Improvements shown on the Construction Documents, which Landlord approval shall not be unreasonably withheld or conditioned, and shall be granted or denied within five (5) business days after delivery of such Tenant Change to Landlord.

3.4 Permits. The Construction Documents as approved (or deemed approved) pursuant to Section 3.3 shall be the "Approved Working Drawings". Following approval or deemed approval of the Cost Proposal, as described below, Tenant shall promptly thereafter submit or cause to be submitted, the Approved Working Drawings to the appropriate municipal authorities for all applicable building permits necessary to allow "Contractor," as that term is defined in Section 4.1, below, to commence and fully complete the construction of the applicable Tenant Improvements (the "Permits").

3.5 Time Deadlines. Intentionally omitted.

4. CONSTRUCTION OF THE TENANT IMPROVEMENTS

4.1 Contractor. A contractor designated by Tenant and reasonably approved by Landlord ("Contractor") shall construct the Tenant Improvements.

4.2 Cost Proposal. After the Approved Working Drawings are approved by Landlord and Tenant, Tenant shall provide Landlord with a cost proposal (or cost proposals) in accordance with the Approved Working Drawings for Landlord's approval, which approval shall not be unreasonably withheld, which cost proposal(s) shall include, as nearly as possible, the cost of all Tenant Improvements Allowance Items to be incurred by Tenant in connection with the design and construction of the Tenant Improvements (the "Cost Proposal"). Tenant will consult with Landlord prior to approving the contractors to whom it will be bid and Landlord may review bid packages at Landlord's written request. The date on which Landlord approves the Cost Proposal shall be known hereafter as the "Cost Proposal Delivery Date".

4.3 Construction of Tenant Improvements by Contractor.

4.3.1 Payment of Tenant Improvements Allowance. Tenant shall be responsible to fund the entire cost of the Tenant Improvements less the amount of the Tenant Improvements Allowance prior to Landlord being required to fund any portion of the Tenant Improvements Allowance. Once Tenant has funded the required portion of the Tenant Improvements, as verified with paid invoices, then Tenant may submit a Payment Request to Landlord seeking disbursement of the Tenant Improvements Allowance to fund Tenant Improvements costs incurred by Tenant up to but not to exceed the full value of the Tenant Improvements Allowance. Unless otherwise agreed by the parties, all Tenant Improvements paid for by the Tenant Improvements Allowance shall be deemed Landlord's property under the terms of the Lease. Tenant hereby acknowledges and agrees that Tenant shall be responsible for all costs associated with the Tenant Improvements to the extent the same exceed the Tenant Improvements Allowance.

4.3.2 Tenant's Retention of Contractor. Tenant shall independently retain Contractor to construct the Tenant Improvements in accordance with the applicable Approved Working Drawings and the applicable Cost Proposal. Landlord shall be entitled to review the Tenant's construction contract with the Contractor upon Landlord's written request. Tenant shall be responsible to ensure the Contractor performs the construction work in a good and workmanlike manner and shall endeavor to oversee the Contractor's performance of its work to protect Landlord from construction defects.

5. COMPLETION OF THE TENANT IMPROVEMENTS; LEASE COMMENCEMENT DATE

5.1 Substantial Completion. Tenant shall give Landlord at least twenty (20) days prior written notice of the date that Tenant reasonably anticipates that the Tenant Improvements will be Substantially Complete (as defined below). For purposes of this Lease, "Substantial Completion" shall occur upon the completion of the last of the following to occur: (i) the completion of construction of the Tenant Improvements substantially pursuant to the Approved Working Drawings for such Tenant Improvements (each as reasonably determined by the Architect and Tenant), with the exception of any punch list items which do not impair Tenant's ability to occupy the Premises for their contemplated use, (ii) the acquisition of a certificate of occupancy or its legal equivalent allowing occupancy of the Premises (a "Sign Off"), and (iii) delivery of a certificate of substantial completion from the Architect confirming the matters set forth in the foregoing clause (i). In the event that the Sign Off is not a final certificate of occupancy, Tenant shall diligently prosecute the work necessary to achieve a full certificate of occupancy and use commercially reasonable efforts to obtain such full certificate of occupancy as soon as reasonably practicable following Substantial Completion.

5.2 Intentionally omitted.

5.3 Walk-through and Punchlist. After the Tenant Improvements are Substantially Completed and prior to Tenant's move-in into the Premises, following two (2) days' advance written notice from Tenant to Landlord, Tenant shall cause the Contractor to inspect the Premises with a representative of Landlord and complete a punch list of unfinished items of the Tenant Improvements. After Landlord and Tenant have mutually agreed upon the punch list, authorized representatives for Landlord and Tenant shall execute said punch list. The items listed on such punch list shall be completed by the Contractor within thirty (30) days after the approval of such punch list or as soon thereafter as reasonably practicable, provided that in the event a punch list item reasonably requires longer than thirty (30) days to complete, then Tenant shall cause Contractor to commence the completion of such particular item within thirty (30) days and diligently pursue the same to completion. The terms of this Section 5.3 will not affect the occurrence of the Substantial Completion of the Premises or the occurrence of the Rent Commencement Date.

5.4 Intentionally omitted.

5.5 Delay Not Caused by Parties. Neither the Landlord nor Tenant shall be considered to be in default of the provisions of this Tenant Work Letter for delays in performance due to Force Majeure.

5.6 Intentionally omitted.

5.7 Intentionally omitted.

6. MISCELLANEOUS

6.1 Tenant's Entry Into the Premises. As a condition to Tenant's entry into the Premises, Tenant shall comply with and perform, and shall cause its employees, agents, contractors, subcontractors, material suppliers and laborers to comply with and perform, all of Tenant's insurance and indemnity obligations and other obligations governing the conduct of Tenant at the Property under this Lease.

Any independent contractor of Tenant (or any employee or agent of Tenant) performing any work or invasive inspections in the Premises shall be reasonably subject to all of the terms, conditions and requirements contained in the Lease (including without limitation the provisions of Article 10) and, prior to such entry, Tenant shall provide Landlord with evidence of the insurance coverages required pursuant to Article 10. Tenant and any Tenant contractor performing any work or invasive inspections in the Premises shall use reasonable efforts not to interfere in any way with construction of, and shall not damage the Landlord Work or the common areas or other parts of the Building.

6.2 Tenant's Representative. Tenant has designated Sinu Bhandaru and Sam Stubbs as its sole representatives with respect to the matters set forth in this Tenant Work Letter, who, until further notice to Landlord, shall have full authority and responsibility to act on behalf of the Tenant as required in this Tenant Work Letter.

6.3 Landlord's Representative. Landlord has designated J. Randal Long as its sole representative with respect to the matters set forth in this Tenant Work Letter, who, until further notice to Tenant, shall have full authority and responsibility to act on behalf of the Landlord as required in this Tenant Work Letter.

6.4 Intentionally omitted.

6.5 General. This Work Letter shall not be deemed applicable to any additional space added to the Premises at any time or from time to time, whether by any options under the Lease or otherwise, or to any portion of the Premises or any additions to the Premises in the event of a renewal or extension of the original Lease Term, whether by any options under the Lease or otherwise, unless and to the extent expressly provided in the Lease or any amendment or supplement to the Lease that such additional space is to be delivered to Tenant in the same condition the initial Premises is to be delivered.

6.6 Insurance. In addition to the requirements of Article 8.5 and Article 10 of this Lease, prior to the commencement of the Tenant Improvements, Tenant shall provide Landlord with evidence that Tenant carries Builder's All Risk insurance in an amount reasonably approved by Landlord covering the construction of such Tenant Improvements, and such other insurance as Landlord may reasonably require, it being understood and agreed that all of such Tenant Improvements shall be insured by Tenant pursuant to Article 10 of this Lease immediately upon completion thereof. In addition, Tenant's contractors, subcontractors, and architects shall be required to carry Commercial General Liability Insurance in an amount approved by Landlord and otherwise in accordance with the requirements of Article 10 of this Lease and such general liability insurance shall name the Landlord Parties as additional insureds. In addition, Tenant's contractors and subcontractors shall be required to carry workers compensation insurance with a waiver of subrogation in favor of Landlord Parties.

ATTACHMENT 1

LANDLORD'S WORK

-Add one (1) 7' x 22' window to the Building which is similar to existing windows.
-Add one (1) 6' x 8' insulated electronically controlled roll-up door exiting onto the loading dock.

ATTACHMENT 2

Intentionally omitted

ATTACHMENT 3

PRELIMINARY PLANS

[to be attached]

EXHIBIT E

RULES AND REGULATIONS

Tenant shall faithfully observe and comply with the following Rules and Regulations. Landlord shall not be responsible to Tenant for the nonperformance of any of said Rules and Regulations by or otherwise with respect to the acts or omissions of any other tenants or occupants of the Project. In the event of any conflict between the Rules and Regulations and the other provisions of this Lease, the latter shall control.

1. Tenant shall not alter any lock or install any new or additional locks or bolts on any doors or windows of the Premises without obtaining Landlord's prior written consent, which shall not be unreasonably withheld, conditioned or delayed. If Tenant shall affix additional locks on doors then Tenant shall furnish Landlord with copies of keys or pass cards or similar devices for said locks. Tenant shall bear the cost of any lock changes or repairs required by Tenant. Two initial keys will be furnished by Landlord for the Premises, and any additional keys required by Tenant must be obtained from Landlord at a reasonable cost to be established by Landlord. Upon the termination of this Lease, Tenant shall restore to Landlord all keys of stores, offices, and toilet rooms, either furnished to, or otherwise procured by, Tenant and in the event of the loss of keys so furnished, Tenant shall pay to Landlord the cost of replacing same or of changing the lock or locks opened by such lost key if Landlord shall deem it necessary to make such changes.

2. All doors opening to public corridors shall be kept closed at all times except for normal ingress and egress to the Premises.

3. Landlord reserves the right to close and keep locked all entrance and exit doors of the Building during such hours as are customary for comparable buildings in the vicinity of the Building. Tenant, its employees and agents must be sure that the doors to the Building are securely closed and locked when leaving the Premises if it is after the normal hours of business for the Building. Any tenant, its employees, agents or any other persons entering or leaving the Building at any time when it is so locked, or any time when it is considered to be after normal business hours for the Building, may be required to sign the Building register. Access to the Building may be refused unless the person seeking access has proper identification or has a previously arranged pass for access to the Building. Landlord will furnish passes to persons for whom Tenant requests same in writing. Tenant shall be responsible for all persons for whom Tenant requests passes and shall be liable to Landlord for all acts of such persons. The Landlord and his agents shall in no case be liable for damages for any error with regard to the admission to or exclusion from the Building of any person. In case of invasion, mob, riot, public excitement, or other commotion, Landlord reserves the right to prevent access to the Building or the Project during the continuance thereof by any means it deems appropriate for the safety and protection of life and property.

4. Except for shipments by Tenant of its product or receipt by Tenant of goods in the ordinary course of the operation of its business, no furniture, freight or equipment of any kind shall be brought into the Building without prior notice to Landlord. All moving activity into or out of the Building shall be scheduled with Landlord and done only at such time and in such manner as Landlord reasonably designates. Landlord shall have the right to prescribe the weight, size and position of all safes and other heavy property brought into the Building and also the times and manner of moving the same in and out of the Building. Safes and other heavy objects shall, if considered necessary by Landlord, stand on supports of such thickness as is necessary to properly distribute the weight. Landlord will not be responsible for loss of or damage to any such safe or property in any case. Any damage to any part of the Building, its contents, occupants or visitors by moving or maintaining any such safe or other property shall be the sole responsibility and expense of Tenant.

5. Intentionally omitted.

6. The requirements of Tenant will be attended to only upon application at the management office for the Project or at such office location designated by Landlord. Employees of Landlord shall not perform any work or do anything outside their regular duties unless under special instructions from Landlord.

7. No sign, advertisement, notice or handbill shall be exhibited, distributed, painted or affixed by Tenant on any part of the Premises or the Building without the prior written consent of the Landlord. Tenant shall not disturb, solicit, peddle, or canvass any occupant of the Project and shall cooperate with Landlord and its agents of Landlord to prevent same.

8. The toilet rooms, urinals, wash bowls and other apparatus shall not be used for any purpose other than that for which they were constructed, and no foreign substance of any kind whatsoever shall be thrown therein. The expense of any breakage, stoppage or damage resulting from the violation of this rule shall be borne by the tenant who, or whose servants, employees, agents, visitors or licensees shall have caused same.

9. Discharge of industrial sewage to the Building plumbing system shall only be permitted if Tenant, at its sole expense, shall have obtained all necessary permits and licenses therefor, including without limitation permits from state and local authorities having jurisdiction thereof.

10. Tenant shall not overload the floor of the Premises, nor mark, drive nails or screws, or drill into the partitions, woodwork or drywall or in any way deface the Premises or any part thereof without Landlord's prior written consent; provided, however, that Landlord's prior written consent shall not be required for the hanging of normal and customary office artwork and personal items. Tenant shall not purchase spring water, ice, towel, linen, maintenance or other like services from any person or persons not included on an approved list that Landlord shall provide to Tenant upon request. Landlord reserves the right to have Landlord's structural engineer review Tenant's floor loads on the Building at Landlord's expense, unless such study reveals that Tenant has exceeded the floor loads, in which case Tenant shall pay the cost of such survey.

11. Except for vending machines intended for the sole use of Tenant's employees and invitees, no vending machine or machines other than fractional horsepower office machines shall be installed, maintained or operated upon the Premises without the written consent of Landlord.

12. Tenant shall not use or keep in or on the Premises, the Building, or the Project any kerosene, gasoline or other inflammable or combustible fluid, chemical, substance or material.

13. Tenant shall not without the prior written consent of Landlord (not to be unreasonably withheld, conditioned, or delayed) use any method of heating or air conditioning other than that supplied by Landlord (other than as part of the Tenant Improvements).

14. Tenant shall not use, keep or permit to be used or kept, any foul or noxious gas or substance in or on the Premises, or permit or allow the Premises to be occupied or used in a manner offensive or objectionable to Landlord or other occupants of the Project by reason of noise, odors, or vibrations, or interfere with other tenants or those having business therein, whether by the use of any musical instrument, radio, phonograph, or in any other way. Tenant shall not throw anything out of doors, windows or skylights or down passageways.

15. Tenant shall not bring into or keep within the Project, the Building or the Premises any animals (other than service animals), birds, aquariums, or, except in areas designated by Landlord, bicycles or other vehicles.

16. No cooking shall be done or permitted on the Premises, nor shall the Premises be used for the storage of merchandise, for lodging or for any improper, objectionable or immoral purposes. Notwithstanding the foregoing, Underwriters' laboratory-approved equipment and microwave ovens may be used in the Premises for heating food and brewing coffee, tea, hot chocolate and similar beverages for employees and visitors, provided that such use is in accordance with all applicable federal, state, county and city laws, codes, ordinances, rules and regulations.

17. The Premises shall not be used for manufacturing or for the storage of merchandise except as such storage may be incidental to the use of the Premises provided for in the Summary. Tenant shall not occupy or permit any portion of the Premises to be occupied as an office for a messenger-type operation or dispatch office, public stenographer or typist, or for the manufacture or sale of liquor, narcotics, or tobacco in any form, or as a medical office, or as a barber or manicure shop, or as an employment bureau without the express prior written consent of

Landlord. Tenant shall not engage or pay any employees on the Premises except those actually working for such tenant on the Premises nor advertise for laborers giving an address at the Premises.

18. Landlord reserves the right to exclude or expel from the Project any person who, in the judgment of Landlord, is intoxicated or under the influence of liquor or drugs, or who shall in any manner do any act in violation of any of these Rules and Regulations.

19. Tenant, its employees and agents shall not loiter in or on the entrances, corridors, sidewalks, lobbies, courts, halls, stairways, vestibules or any Common Areas for the purpose of smoking tobacco products or for any other purpose, nor in any way obstruct such areas, and shall use them only as a means of ingress and egress for the Premises.

20. Tenant shall not waste electricity, water or air conditioning and agrees to reasonably cooperate with Landlord to ensure the most effective operation of the Building's heating and air conditioning system, and shall refrain from attempting to adjust any controls.

21. Tenant shall store all its trash and garbage within the interior of the Premises. No material shall be placed in the trash boxes or receptacles if such material is of such nature that it may not be disposed of in the ordinary and customary manner of removing and disposing of trash and garbage in the city in which the Building is located without violation of any law or ordinance governing such disposal. All trash, garbage and refuse disposal shall be made only through entry-ways provided for such purposes at such times as Landlord shall designate.

22. Tenant shall comply with all safety, fire protection and evacuation procedures and regulations established by Landlord or any governmental agency.

23. Any persons employed by Tenant to do janitorial work shall be subject to the prior written approval of Landlord (not to be unreasonably withheld, conditioned, or delayed), and while in the Building and outside of the Premises, shall be subject to and under the control and direction of the Building manager (but not as an agent or servant of such manager or of Landlord), and Tenant shall be responsible for all acts of such persons.

24. No awnings or other projection shall be attached to the outside walls of the Building without the prior written consent of Landlord (not to be unreasonably withheld, conditioned, or delayed), and no curtains, blinds, shades or screens shall be attached to or hung in, or used in connection with, any window or door of the Premises other than Landlord standard drapes. All electrical ceiling fixtures hung in the Premises or spaces along the perimeter of the Building must be fluorescent and/or of a quality, type, design and a warm white bulb color approved in advance in writing by Landlord. Neither the interior nor exterior of any windows shall be coated or otherwise sunscreened without the prior written consent of Landlord. Tenant shall abide by Landlord's regulations concerning the opening and closing of window coverings which are attached to the windows in the Premises, if any, which have a view of any interior portion of the Building or Building Common Areas.

25. The sashes, sash doors, skylights, windows, and doors that reflect or admit light and air into the halls, passageways or other public places in the Building shall not be covered or obstructed by Tenant, nor shall any bottles, parcels or other articles be placed on the windowsills.

26. Tenant must comply with requests by the Landlord concerning the informing of their employees of items of importance to the Landlord.

27. No smoking is permitted in the Building or on the Project.

28. Tenant hereby acknowledges that Landlord shall have no obligation to provide guard service or other security measures for the benefit of the Premises, the Building or the Project. Tenant hereby assumes all responsibility for the protection of Tenant and its agents, employees, contractors, invitees and guests, and the property thereof, from acts of third parties, including keeping doors locked and other means of entry to the Premises closed, whether or not Landlord, at its option, elects to provide security protection for the Project or any portion thereof. Tenant further assumes the risk that any safety and security devices, services and programs which Landlord elects, in its sole discretion, to provide may not be effective, or may malfunction or be circumvented by an unauthorized third

party, and Tenant shall, in addition to its other insurance obligations under this Lease, obtain its own insurance coverage to the extent Tenant desires protection against losses related to such occurrences. Tenant shall cooperate in any reasonable safety or security program developed by Landlord or required by law.

29. All non-standard office equipment of any electrical or mechanical nature shall be placed by Tenant in the Premises in settings approved by Landlord, to absorb or prevent any vibration, noise and annoyance.

30. Tenant shall not use in any space or in the public halls of the Building, any hand trucks except those equipped with rubber tires and rubber side guards.

31. No auction, liquidation, fire sale, going-out-of-business or bankruptcy sale shall be conducted in the Premises without the prior written consent of Landlord.

32. No tenant shall use or permit the use of any portion of the Premises for living quarters, sleeping apartments or lodging rooms.

Landlord reserves the right at any time to change or rescind any one or more of these Rules and Regulations, or to make such other and further reasonable Rules and Regulations as in Landlord's judgment may from time to time be necessary for the management, safety, care and cleanliness of the Premises, Building, the Common Areas and the Project, and for the preservation of good order therein, as well as for the convenience of other occupants and tenants therein. Landlord may waive any one or more of these Rules and Regulations for the benefit of any particular tenants, but no such waiver by Landlord shall be construed as a waiver of such Rules and Regulations in favor of any other tenant, nor prevent Landlord from thereafter enforcing any such Rules or Regulations against any or all tenants of the Project. Tenant shall be deemed to have read these Rules and Regulations and to have agreed to abide by them as a condition of its occupancy of the Premises.

EXHIBIT F

[*Property Center Name*]

FORM OF TENANT'S ESTOPPEL CERTIFICATE

The undersigned as Tenant under that certain Lease (the "**Lease**") made and entered into as of _____, 201_ by and between _____ as Landlord, and the undersigned as Tenant, for Premises on the _____ floor(s) of the office building located at **[INSERT BUILDING ADDRESS]**, certifies as follows:

1. Attached hereto as **Exhibit F** is a true and correct copy of the Lease and all amendments and modifications thereto. The documents contained in **Exhibit F** represent the entire agreement between the parties as to the Premises.

2. The undersigned currently occupies the Premises described in the Lease, the Lease Term commenced on _____, and the Lease Term expires on _____, and the undersigned has no option to terminate or cancel the Lease or to purchase all or any part of the Premises, the Building and/or the Project.

3. Base Rent became payable on _____.

4. The Lease is in full force and effect and has not been modified, supplemented or amended in any way except as provided in **Exhibit F**.

5. Tenant has not transferred, assigned, or sublet any portion of the Premises nor entered into any license or concession agreements with respect thereto except as follows:

6. Intentionally Omitted.

7. All monthly installments of Base Rent, all Additional Rent and all monthly installments of estimated Additional Rent have been paid when due through _____. The current monthly installment of Base Rent is $_____.

8. All conditions of the Lease to be performed by Landlord necessary to the enforceability of the Lease have been satisfied and, to Tenant's actual knowledge, Landlord is not in default thereunder. In addition, the undersigned has not delivered any notice to Landlord regarding a default by Landlord thereunder.

9. No rental has been paid more than thirty (30) days in advance and no security has been deposited with Landlord except as provided in the Lease.

10. As of the date hereof, there are no existing defenses or offsets, or, to the undersigned's knowledge, claims or any basis for a claim, that the undersigned has against Landlord.

11. If Tenant is a corporation or partnership, each individual executing this Estoppel Certificate on behalf of Tenant hereby represents and warrants that Tenant is a duly formed and existing entity qualified to do business in North Carolina and that Tenant has full right and authority to execute and deliver this Estoppel Certificate and that each person signing on behalf of Tenant is authorized to do so.

12. There are no actions pending against the undersigned under the bankruptcy or similar laws of the United States or any state.

13. To Tenant's actual knowledge, Tenant is in full compliance with all federal, state and local laws, ordinances, rules and regulations affecting its use of the Premises, including, but not limited to, those laws, ordinances, rules or regulations relating to hazardous or toxic materials. Tenant has never permitted or suffered, nor does Tenant have any knowledge of, the generation, manufacture, treatment, use, storage, disposal or discharge of any hazardous,

toxic or dangerous waste, substance or material in, on, under or about the Project or the Premises or any adjacent premises or property in violation of any federal, state or local law, ordinance, rule or regulation.

14. To the undersigned's knowledge, all tenant improvement work to be performed by Landlord under the Lease has been completed in accordance with the Lease and has been accepted by the undersigned and all reimbursements and allowances due to the undersigned under the Lease in connection with any tenant improvement work have been paid in full. All work (if any) in the common areas required by the Lease to be completed by Landlord has been completed and all parking spaces required by the Lease have been furnished and/or all parking ratios required by the Lease have been met.

The undersigned acknowledges that this Estoppel Certificate may be delivered to Landlord or to a prospective mortgagee or prospective purchaser, and acknowledges that said prospective mortgagee or prospective purchaser will be relying upon the statements contained herein in making the loan or acquiring the property of which the Premises are a part and that receipt by it of this certificate is a condition of making such loan or acquiring such property.

Executed at _____ on the ____ day of _____, 201__.

"Tenant":

_____

a _____

By: _____

Its:

By: _____

Its: _____

EXHIBIT G

[*Property Center Name*]

ENVIRONMENTAL QUESTIONNAIRE

ENVIRONMENTAL QUESTIONNAIRE
FOR COMMERCIAL AND INDUSTRIAL PROPERTIES

Property Name: _____

Property Address: _____

Instructions: The following questionnaire is to be completed by the Lessee representative with knowledge of the planned operations for the specified building/location. Please print clearly and attach additional sheets as necessary.

1.0 PROCESS INFORMATION

Describe planned use, and include brief description of manufacturing processes employed.

_____
_____
_____

2.0 HAZARDOUS MATERIALS

Are hazardous materials used or stored? If so, continue with the next question. If not, go to Section 3.0.

2.1 Are any of the following materials handled on the Property?Yes ☐ No ☐

(A material is handled if it is used, generated, processed, produced, packaged, treated, stored, emitted, discharged, or disposed.) If so, complete this section. If this question is not applicable, skip this section and go on to Section 5.0.

☐ Explosives	☐ Fuels	☐ Oils
☐ Solvents	☐ Oxidizers	☐ Organics/Inorganics
☐ Acids	☐ Bases	☐ Pesticides
☐ Gases	☐ PCBs	☐ Radioactive Materials
☐ Other (please specify)		

22. If any of the groups of materials checked in Section 2.1, please list the specific material(s), use(s), and quantity of each chemical used or stored on the site in the Table below. If convenient, you may substitute a chemical inventory and list the uses of each of the chemicals in each category separately.

Material	Physical State (Solid, Liquid, or Gas)	Usage	Container Size	Number of Containers	Total Quantity

23. Describe the planned storage area location(s) for these materials. Please include site maps and drawings as appropriate.

3.0 HAZARDOUS WASTES

Are hazardous wastes generated? Yes ☐ No ☐

If yes, continue with the next question. If not, skip this section and go to section 4.0.

3.1 Are any of the following wastes generated, handled, or disposed of (where applicable) on the Property?

☐ Hazardous wastes ☐ Industrial Wastewater
☐ Waste oils ☐ PCBs
☐ Air emissions ☐ Sludges
☐ Regulated Wastes ☐ Other (please specify)

32. List and quantify the materials identified in Question 3-1 of this section.

WASTE GENERATED	RCRA listed Waste?	SOURCE	APPROXIMATE MONTHLY QUANTITY	WASTE CHARACTERIZATION	DISPOSITION

33. Please include name, location, and permit number (e.g. EPA ID No.) for transporter and disposal facility, if applicable). Attach separate pages as necessary.

Transporter/Disposal Facility Name	Facility Location	Transporter (T) or Disposal (D) Facility	Permit Number

34. Are pollution controls or monitoring employed in the process to prevent or minimize the release of wastes into the environment?Yes ☐ No ☐

35. If so, please describe.

4.0 USTS/ASTS

4.1 Are underground storage tanks (USTs), aboveground storage tanks (ASTs), or associated pipelines used for the storage of petroleum products, chemicals, or liquid wastes present on site (lease renewals) or required for planned operations (new tenants)?Yes___No___

If not, continue with section 5.0. If yes, please describe capacity, contents, age, type of the USTs or ASTs, as well any associated leak detection/spill prevention measures. Please attach additional pages if necessary.

Capacity	Contents	Year Installed	Type (Steel, Fiberglass, etc)	Associated Leak Detection / Spill Prevention Measures*

*Note: The following are examples of leak detection / spill prevention measures:

Integrity testing	Inventory reconciliation	Leak detection system
Overfill spill protection	Secondary containment	Cathodic protection

42. Please provide copies of written tank integrity test results and/or monitoring documentation, if available.

43. Is the UST/AST registered and permitted with the appropriate regulatory agencies?Yes ☐ No ☐
If so, please attach a copy of the required permits.

44. If this Questionnaire is being completed for a lease renewal, and if any of the USTs/ASTs have leaked, please state the substance released, the media(s) impacted (e.g., soil, water, asphalt, etc.), the actions taken, and all remedial responses to the incident.

45. If this Questionnaire is being completed for a lease renewal, have USTs/ASTs been removed from the Property?Yes ☐ No ☐

If yes, please provide any official closure letters or reports and supporting documentation (e.g., analytical test results, remediation report results, etc.).

46. For Lease renewals, are there any above or below ground pipelines on site used to transfer chemicals or wastes?Yes ☐ No ☐

For new tenants, are installations of this type required for the planned operations?

Yes ☐ No ☐

If yes to either question, please describe.

5.0 ASBESTOS CONTAINING BUILDING MATERIALS

Please be advised that an asbestos survey may have been performed at the Property. If provided, please review the information that identifies the locations of known asbestos containing material or presumed asbestos containing material. All personnel and appropriate subcontractors should be notified of the presence of these materials, and informed not to disturb these materials. Any activity that involves the disturbance or removal of these materials must be done by an appropriately trained individual/contractor.

6.0 REGULATORY

61. Does the operation have or require a National Pollutant Discharge Elimination System (NPDES) or equivalent permit?Yes ☐ No ☐

If so, please attach a copy of this permit.

62. Has a Hazardous Materials Business Plan been developed for the site?Yes ☐ No ☐
If so, please attach a copy.

CERTIFICATION

I am familiar with the real property described in this questionnaire. By signing below, I represent and warrant that the answers to the above questions are complete and accurate to the best of my knowledge. I also understand that Lessor will rely on the completeness and accuracy of my answers in assessing any environmental liability risks associated with the property.

Signature: _____

Name: _____

Title: _____

Date: _____

Telephone: _____

EXHIBIT H

RESPONSIBILITY MATRIX

BioPoint Responsibility Matrix

Landlord Held Contracts (to be billed through CAM)	
Janitorial	Common Areas
Pest Control	Exterior & Common Areas
Access System	Common Areas
Electric	Common Areas, Exterior
Gas	HVAC
Water	Common Areas
Window Cleaning	Exterior Only
Elevators	PM Contract
HVAC	Common Areas
Lighting	Common Areas
Roof	Repairs & Maintenance
Plumbing	Common Areas
FL&S	Entire Building
Landscaping	Exterior maintenance
Fitness Center	Equipment maintenance
Exterior Maintenance	All exterior maintenance
Snow Removal	Parking lot and sidewalks
Trash & Recycling	From common dumpsters
Generator Maintenance	Quarterly PM Service
Security	Nightly roving patrol checks

Billed Monthly Based on Actuals	
Electric	Metered Usage
Water	Metered Usage
HVAC	Tenant will be responsible for repairs within their space
Fire Life Safety	Tenant Space

Tenant Held Contracts	
Janitorial	Tenant Space
Pest Control	Tenant Space
Access System - tied into building system	Tenant Space
Lighting	Tenant Space
Trash & Recycling	Tenant Space
Gas	Tenant Equipment
Plumbing	Tenant Space

EXHIBIT I

STORAGE AREA

FIRST AMENDMENT TO LEASE

THIS FIRST AMENDMENT TO LEASE (this "***Amendment***") is made and entered into as of the 23 day of December 2019 (the "***Effective Date***"), by and between **DURHAM TW ALEXANDER, LLC**, a Delaware limited liability company ("***Landlord***"), and **PRECISION BIOSCIENCES, INC.**, a Delaware corporation (formerly a North Carolina corporation) ("***Tenant***").

STATEMENT OF PURPOSE

WHEREAS, Landlord and Tenant entered into that certain Lease dated October 2, 2018 (the "***Existing Lease***"), for certain premises containing approximately 17,296 rentable square feet on the first (1st) floor (the "***Existing Premises***") located in the building known as Biopoint Innovation Labs located at 20 TW Alexander Drive, Research Triangle Park, North Carolina 27709 (the "***Building***"), as more particularly described in the Lease.

WHEREAS, Landlord and Tenant desire to amend the terms of the Existing Lease: (i) to expand the Existing Premises, (ii) to extend the Lease Term, and (iii) to modify certain other terms of the Lease. For purposes hereof, the Existing Lease as amended by this Amendment is referred to as the "***Lease***." All capitalized terms not otherwise defined herein shall have the meanings set forth in the Existing Lease.

NOW, THEREFORE, in consideration of the statement of purpose, the mutual covenants contained herein and other valuable consideration, the receipt of which is hereby acknowledged, the parties hereto agree as follows:

1. **Recitals**. The recitals shall form a part of this Amendment.

2. **Expansion of the Premises**.

(a) Tenant desires to expand the Existing Premises to include an additional approximately 16,339 rentable square feet commonly known as Suite 140 located in the first (1st) floor of the Building, all as further shown on **Exhibit A** attached hereto and incorporated herein by reference (the "***Expansion Premises***"). For avoidance of ambiguity, Section 1.2 of the Existing Lease shall also apply to the measurement of the Expansion Premises. Effective as of the Expansion Premises Rent Commencement Date (as defined in Section 2(b) below), the Existing Premises shall be expanded by adding the Expansion Premises and the term "Premises" under the Lease shall be redefined to be that area shown on **Exhibit A** as the Existing Premises plus the Expansion Premises, totaling approximately 33,635 rentable square feet of space (the "***Revised Premises***").

(b) The Expansion Premises shall be added to the Lease on the "***Expansion Premises Rent Commencement Date***" which shall be defined as the earlier of: (i) delivery of the certificate of occupancy for the Expansion Premises; or (ii) July 1, 2020. Notwithstanding the foregoing, Landlord shall allow limited beneficial occupancy of up to ten (10) Tenant employees in that area of the Expansion Premises as shown on **Exhibit D** ("***Limited Occupancy Space***"**)**. Tenant shall ensure that such limited beneficial occupancy falls under an existing certificate of occupancy and complies with any and all occupancy laws and applicable regulations.

3. **First Extension Term**.

(a) The Lease Term for the Existing Premises is hereby extended for a period commencing on the Expansion Premises Rent Commencement Date and expiring on August 31, 2027 (the "***First Extension Term Expiration Date***"), which comprises a period of approximately eighty-six (86) months (the "***Existing Premises Extension Term***").

(b) The Lease Term with respect to the Expansion Premises shall commence on the Expansion Premises Rent Commencement Date and shall expire on the First Extension Term Expiration Date (the "***Expansion Premises Term***" and together with the Existing Premises Extension Term, collectively, the "***First Extension Term***").

(c) Landlord and Tenant hereby acknowledge that Tenant's option to extend the Lease Term as set forth in Section 2.2 of the Lease remains in full force and effect and is not modified by this Amendment.

4. **Base Rent**.

(a) As of the Effective Date Tenant shall pay Base Rent for the Existing Premises in accordance with the following rent schedule. (The schedule below is the same as the Base Rent schedule listed in the Existing Lease with an extended period added to cover the full First Extension Term):

Time Period	Annual Base Rent	Monthly Installment of Base Rent	Annual Base Rent per Rentable Square Foot
07/01/2019 - 06/30/2020	$449,696.04	$37,474.67	$26.00
07/01/2020 - 06/30/2021	$463,186.92	$38,598.91	$26.78
07/01/2021 - 06/30/2022	$477,023.64	$39,751.97	$27.58
07/01/2022 - 06/30/2023	$491,379.36	$40,948.28	$28.41
07/01/2023 - 06/30/2024	$506,080.92	$42,173.41	$29.26
07/01/2024 - 06/30/2025	$521,301.48	$43,441.79	$30.14
07/01/2025 - 06/30/2026	$537,040.80	$44,753.40	$31.05
07/01/2026 - 06/30/2027	$553,126.08	$46,093.84	$31.98
07/01/2027 - 08/31/2027	$569,730.24	$47,477.52	$32.94

(b) Notwithstanding anything contained in the Lease to the contrary, commencing on the Expansion Premises Rent Commencement Date and continuing through the First Extension Term Expiration Date, Tenant shall, at the time and in the manner provided in the Lease, pay to Landlord as Base Rent for the Expansion Premises, the amounts set forth in the following rent schedule, plus any applicable tax thereon:

Time Period*	Annual Base Rent	Monthly Installment of Base Rent	Annual Base Rent per Rentable Square Foot
07/01/2020 - 06/30/2021**	$457,491.96	$38,124.33	$28.00
07/01/2021 - 06/30/2022	$471,216.72	$39,268.06	$28.84
07/01/2022 - 06/30/2023	$485,431.68	$40,452.64	$29.71
07/01/2023 - 06/30/2024	$499,973.40	$41,664.45	$30.60
07/01/2024 - 06/30/2025	$514,841.88	$42,903.49	$31.51
07/01/2025 - 06/30/2026	$530,364.00	$44,197.00	$32.46
07/01/2026 - 06/30/2027	$546,212.76	$45,517.73	$33.43
07/01/2027 - 08/31/2027	$562,715.16	$46,892.93	$34.44

*Note: Notwithstanding the above table, the dates of the time periods set forth therein will be adjusted based on the actual Expansion Premises Rent Commencement Date if such date occurs on a date earlier than July 1, 2020, but the final date shall remain the same.

Note: Provided Tenant is not in monetary default of the terms of this Lease, after expiration of any applicable notice and cure period, Tenant shall have no obligation to pay any Base Rent attributable to: (i) the first two (2) months of for the Expansion Premises, and only the Expansion Premises, following the Expansion Premises Rent Commencement Date (the "*Expansion Premises Abatement Period***"). Tenant shall be obligated to pay all of Tenant's Share of Direct Expenses attributable to the Expansion Premises during the Expansion Premises Abatement Period.

5. **Additional Rent**.

(a) Tenant shall continue to pay Tenant's Share of Direct Expenses for the Existing Premises in accordance with the Lease until the Expansion Premises Rent Commencement Date.

(b) Commencing on the Expansion Premises Rent Commencement Date and continuing until the First Extension Term Expiration Date, as may be extended, Tenant shall pay Tenant's Share of Direct Expenses for the Revised Premises, as more particularly described in Article 4 of the Lease with an updated Tenant's Share. The term "Tenant's Share" under the Lease shall be redefined to be 22.58% as of the Expansion Premises Rent Commencement Date.

6. **Delivery of Expansion Premises**. Tenant shall accept the Expansion Premises and all components thereof including, but not limited to, electrical and mechanical in its presently existing "as-is", "where-is", with all faults condition and Landlord shall not be obligated to provide or pay for any improvement work or services related to the improvement of the Expansion Premises except as otherwise expressly set forth in the Tenant Work Letter attached hereto as **Exhibit C** attached hereto and incorporated herein by reference. The acceptance of the Expansion Premises in "as-is" condition shall in no way limit Landlord's repair obligations set forth in the Lease.

7. **Security Deposit**. Prior to the Effective Date, Tenant shall provide an additional One Hundred Fifty-Two Thousand Four Hundred Ninety-Seven and 32/100 Dollars ($152,497.32) (which is four (4) months Base Rent for the Expansion Premises at a rate of $38,124.33 per month) to be added to the Security Deposit under the Lease, which shall mean the total Security Deposit amount required under the Lease shall be Three Hundred Two Thousand Three Hundred Ninety-Six and 00/100 Dollars ($302,396.00) (the "***Revised Premises Security Deposit***"). For the avoidance of doubt, the Revised Premises Security Deposit shall be held pursuant to Article 21 of the Lease and this Section 7 shall control future reductions of the Revised Premises Security Deposit. So long as Tenant has not been in default beyond any applicable notice and cure period at any time during the Term of the Lease, then at the end of the third (3rd) Lease Year, the Revised Premises Security Deposit shall be reduced to Two Hundred Twenty-Six Thousand Seven Hundred Ninety-Seven and 00/100 Dollars ($226,797.00). So long as Tenant has not been in default beyond any applicable notice and cure period at any time during the Term of the Lease, then at the end of the fifth (5th) Lease Year, the Revised Premises Security Deposit shall be reduced to One Hundred Fifty-One Thousand One Hundred Ninety-Eight and 00/100 Dollars ($151,198.00) for the remainder of the Lease Term, as extended.

8. **Additional Right of First Offer**.

(a) The right of first offer provided in Section 1.3 of the Existing Lease for Tenant shall continue to apply as stated therein.

(b) Beginning on the Effective Date, Landlord hereby grants to the Original Tenant, a one-time right of first offer with respect to **Suite 100 containing 29,191 rentable square feet** located in the Building as set forth in **Exhibit B** attached hereto, (the "***Suite 100 First Offer Space***"). Notwithstanding the foregoing, such first offer right of Tenant shall commence only following the expiration or earlier termination of the initial lease (including renewals) of the Suite 100 First Offer Space, and such right of first offer shall be subordinate to all rights of which are set forth in leases of space in the Project as of the date hereof, including any renewal, extension or expansion rights set forth in such leases, regardless of whether such renewal, extension or expansion rights are executed strictly in accordance with their terms, or pursuant to a lease amendment or a new lease (collectively, the "***Superior Right Holders***") with respect to such Suite 100 First Offer Space. Tenant's right of first offer shall not be applicable during any Option Term. Tenant's right of first offer shall be on the terms and conditions set forth in this Section 8.

(c) **Procedure for Offer**. Landlord shall notify Tenant (the "***Suite 100 First Offer Notice***") when the Suite 100 First Offer Space, any portion thereof, or such larger space that includes the Suite 100 First Offer Space becomes available for lease to third parties, provided that no Superior Right Holder wishes to lease such space. Pursuant to such Suite 100 First Offer Notice, Landlord shall offer to lease to Tenant the then available Suite 100 First Offer Space and any additional space noted within the Suite 100 First Offer Notice. The Suite 100 First Offer Notice shall describe the space so offered to Tenant (which the parties acknowledge may include a portion of the Suite 100 First Offer Space, only the Suite 100 First Offer Space, or the Suite 100 First Offer Space plus additional contiguous

space the Landlord is offering for lease) and shall set forth the "Suite 100 First Offer Rent," as that term is defined in Section 8(e) below, and the other economic terms upon which Landlord is willing to lease such space to Tenant.

(d) **Procedure for Acceptance**. If Tenant wishes to exercise Tenant's right of first offer with respect to the space described in the Suite 100 First Offer Notice, then within ten (10) business days of delivery of the Suite 100 First Offer Notice to Tenant, Tenant shall deliver notice to Landlord of Tenant's election to exercise its right of first offer with respect to the entire space described in the Suite 100 First Offer Notice on the terms contained in such notice. If Tenant does not so notify Landlord within the ten (10) business day period, then Landlord shall be free to lease the space described in the Suite 100 First Offer Notice to anyone to whom Landlord desires on any terms Landlord desires. Notwithstanding anything to the contrary contained herein, Tenant must elect to exercise its right of first offer, if at all, with respect to all of the space offered by Landlord to Tenant at any particular time, and Tenant may not elect to lease only a portion thereof.

(e) **Suite 100 First Offer Space Rent**. The "Rent" payable by Tenant for the Suite 100 First Offer Space (the "***Suite 100 First Offer Rent***") shall be equal to the Fair Rental Value (as defined in Section 2.2.2 of the Lease) as of the "Suite 100 First Offer Commencement Date," as that term is defined in Section 8(g), below.

(f) **Construction In Suite 100 First Offer Space**. Tenant shall take the Suite 100 First Offer Space in its "as is" condition (subject to Landlord's repair obligations in the Lease), subject to any improvement allowance granted as a component of the Fair Rental Value, and the construction of improvements in the Suite 100 First Offer Space shall comply with the terms of the Lease for Alterations.

(g) **Amendment to Lease**. If Tenant timely exercises Tenant's right to lease the Suite 100 First Offer Space as set forth herein, Landlord and Tenant shall promptly thereafter execute an amendment to this Lease for such Suite 100 First Offer Space upon the terms and conditions as set forth in the Suite 100 First Offer Notice and this Section 8. Tenant shall commence payment of Rent for the Suite 100 First Offer Space, and the term of the Suite 100 First Offer Space shall commence upon the date of delivery of the Suite 100 First Offer Space to Tenant (the "***Suite 100 First Offer Commencement Date***") and terminate on the date set forth in the Suite 100 First Offer Notice.

(h) **Termination of Suite 100 Right of First Offer**. The rights contained in this Section 8 shall be personal to the Original Tenant and its Permitted Assignees, and may only be exercised by the Original Tenant or a Permitted Assignee (and not any other assignee, sublessee or other transferee of the Original Tenant's interest in this Lease) if the Original Tenant occupies the majority of the Revised Premises. The right of first offer granted herein shall terminate as to particular Suite 100 First Offer Space upon the failure by Tenant to exercise its right of first offer with respect to such Suite 100 First Offer Space as offered by Landlord. Tenant shall not have the right to lease Suite 100 First Offer Space, as provided in this Section 8, if, as of the date of the attempted exercise of any right of first offer by Tenant, or as of the scheduled date of delivery of such Suite 100 First Offer Space to Tenant, Tenant is in default under this Lease, after the expiration of any applicable notice and cure period, or Tenant has previously been in default, after the expiration of any applicable notice and cure period, under this Lease more than twice.

9. **Brokers**. Landlord and Tenant hereby warrant to each other that it has had no dealings with any real estate broker or agent in connection with the negotiation of this Amendment, excepting only the real estate brokers or agents specified in Section 13 of the Existing Lease Summary (the "**Brokers**"), and that it knows of no other real estate broker or agent which represented said party who is entitled to a commission in connection with this Amendment. Landlord and Tenant each agree to indemnify and defend each other against and hold the indemnified party harmless from any and all claims, demands, losses, liabilities, lawsuits, judgments, costs and expenses (including without limitation reasonable attorneys' fees) with respect to any leasing commission or equivalent compensation alleged to be owing on account of any dealings with any real estate broker or agent, other than the Brokers, occurring by, through, or under the indemnifying party.

10. **Counterparts/Signatures**. This Amendment may be executed in counterparts. All executed counterparts shall constitute one agreement, and each counterpart shall be deemed an original. The parties hereby acknowledge and agree that electronic signatures, facsimile signatures or signatures transmitted by electronic mail in so-called "pdf" format shall be legal and binding and shall have the same full force and effect as if an original of this Amendment had been delivered. Landlord and Tenant (i) intend to be bound by the signatures (whether original,

faxed or electronic) on any document sent by facsimile or electronic mail, (ii) are aware that the other party will rely on such signatures, and (iii) hereby waive any defenses to the enforcement of the terms of this Amendment based on the foregoing forms of signature.

11. **Miscellaneous**. This Amendment shall become effective only upon full execution and delivery of this Amendment by Landlord and Tenant. This Amendment contains the parties' entire agreement regarding the subject matter covered by this Amendment, and supersedes all prior correspondence, negotiations, and agreements, if any, whether oral or written, between the parties concerning such subject matter. There are no contemporaneous oral agreements, and there are no representations or warranties between the parties not contained in this Amendment. This Amendment shall be construed and enforced in accordance with the laws of the State of North Carolina. Except as modified by this Amendment, the terms and provisions of the Lease shall remain in full force and effect, and the Lease, as modified by this Amendment, shall be binding upon and shall inure to the benefit of the parties hereto, their successors and permitted assigns.

[***Signature Page Follows***]

[***The remainder of this page has been intentionally left blank***]

LANDLORD AND TENANT enter into this Amendment as of the Effective Date above.

LANDLORD:

DURHAM TW ALEXANDER, LLC,
a Delaware limited liability company

By:	/s/Adam B. Sichol
Name:	Adam B. Sichol
Title:	Authorized Signatory

TENANT:

PRECISION BIOSCIENCES, INC.,
a Delaware corporation

By:	/s/ Matt Kane
Name:	Matt Kane
Title:	CEO

EXHIBIT A

THE EXPANSION PREMISES

Suite 140

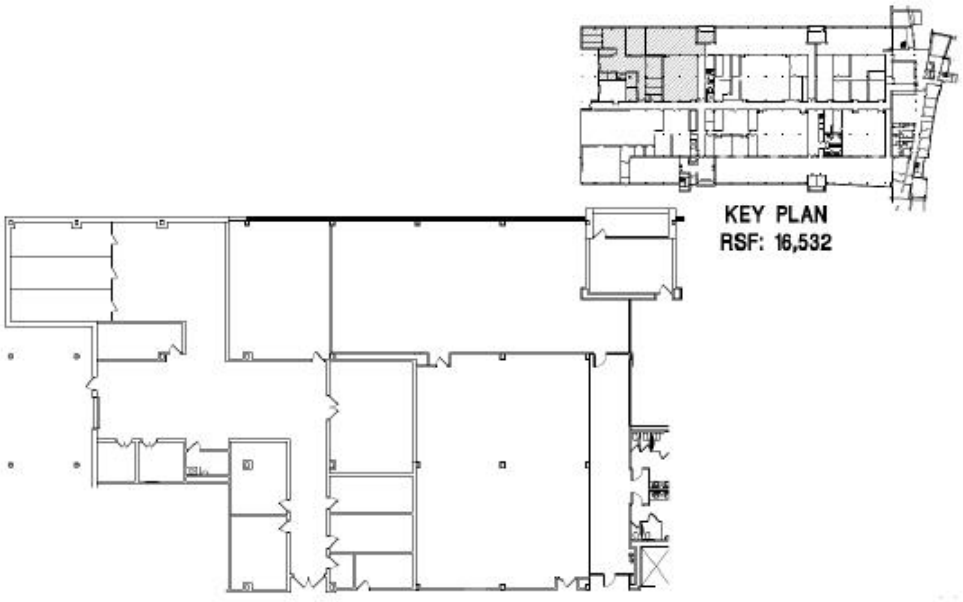


EXHIBIT B

FIRST OFFER SPACE

Suite 100

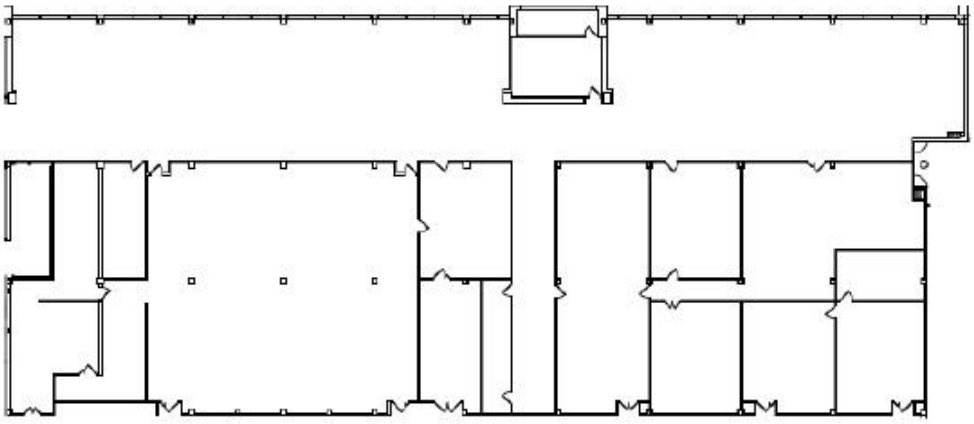


EXHIBIT C

TENANT WORK LETTER

This Tenant Work Letter sets forth the terms and conditions relating to the construction of improvements in the Expansion Premises. All references in this Tenant Work Letter to Articles or Sections of "this Lease" shall mean the relevant portion of the Existing Lease.

1. LANDLORD'S INITIAL CONSTRUCTION IN THE PREMISES

1.1 Landlord Work. None. There is no Landlord Work. Tenant accepts the Expansion Premises in its "as-is", "where-is" condition. The acceptance of the Expansion Premises in "as-is" condition shall in no way limit Landlord's repair obligations set forth in the Lease.

2. TENANT IMPROVEMENTS

2.1 Tenant Improvements Allowance. So long as Tenant is not in default, Tenant shall be entitled to an one-time tenant improvements allowance (the "Tenant Improvements Allowance") in the maximum aggregate amount of: (i) **$898,645.00** for the Expansion Premises (*i.e.*, **$55.00** per rentable square foot of the Expansion Premises) (the "Maximum Allowance Amount") for the hard costs and customary soft costs, as noted below, incurred by Tenant including, without limitation out-of-pocket architectural and engineering fees, construction contractor fees, Tenant's project management fees, and a two percent (2%) project management fee payable to Landlord or its affiliates ("Landlord's Project Oversight Fee"), and permits, and such other costs arising from or relating to the design and construction of Tenant's improvements which are to be permanently affixed to the Expansion Premises in accordance with this Work Letter (the "Tenant Improvements"). Landlord's Project Oversight Fee shall be equivolent to, but not exceed, a total of 2% of the Tenant Improvement Allowance paid to Tenant. In no event shall Tenant be permitted to use any excess Tenant Improvements Allowance toward the Base Rent or any soft costs that are not directly related to the design and construction within the Expansion Premises. For the avoidance of any doubt, the purchase and installation of data and telecommunications cabling shall not be included in the definition of Tenant Improvements and there shall not be any Landlord's Project Oversight Fee payable with respect to costs and expenses related thereto. The Tenant agrees to keep the Landlord advised as to the progress of the work by providing copies of the Contractor's applications for payment. In no event shall Landlord be obligated to make disbursements pursuant to this Tenant Work Letter in a total amount which exceeds the Maximum Allowance Amount and in no event shall Tenant be entitled to any credit for any unused portion of the Tenant Improvements Allowance. All Tenant Improvements for which the Tenant Improvements Allowance has been made available shall be deemed Landlord's property under the terms of the Lease.

2.2 Disbursement of the Tenant Improvements Allowance. Except as otherwise set forth in this Tenant Work Letter, the Tenant Improvements Allowance shall be disbursed by Landlord (each of which disbursements shall be made pursuant to Landlord's reasonable disbursement process) for costs incurred and paid by Tenant related to the design and construction of the Tenant Improvements and for the following items and costs (collectively, the "Tenant Improvements Allowance Items"): (i) payment of the fees of the "Architect" as that term is defined in Section 3.1 of this Tenant Work Letter in connection with the preparation and review of the "Construction Documents," as that term is defined in Section 3.1 of this Tenant Work Letter; (ii) payment of the Landlord's Project Oversight Fee, (iii) the cost of any changes to the Construction Documents or Tenant Improvements required by all applicable building codes (the "Code") enacted after approval of the Construction Documents, (iv) costs payable to the Contractor and any subcontractors, and (v) other costs incurred in connection with the Tenant Improvements to the extent the same can be paid using the Tenant Improvements Allowance pursuant to the specific provisions of this Tenant Work Letter.

Once Landlord is required to disburse any portion of the Tenant Improvements Allowance as noted above, Landlord shall disburse the applicable portion of the Tenant Improvements Allowance within thirty (30) calendar days of receiving from Tenant a Payment Request (as hereinafter defined), an amount equal to the lesser of: (A) the amounts so requested by Tenant of the actual costs and expenses Tenant has incurred and paid in connection with the design and construction of the Tenant Improvements to date less a ten percent (10%) retention (the aggregate amount of such

retentions to be known as the "Final Retention"), and (B) the balance of any remaining available portion of the Tenant Improvements Allowance (not including the Final Retention) provided the following conditions have been satisfied:

(1) Tenant has delivered to Landlord a payment request ("Payment Request") in a form reasonably satisfactory to Landlord specifying the work which has been completed; and

(2) Tenant's general contractor and/or architect shall have submitted an application for payment and sworn statement substantially in the form of AIA Document G702 and AIA Document G703; and

(3) Tenant has submitted to Landlord lien waivers or partial lien waivers from all contractors, first tier subcontractors, artchitects, and first tier materialmen who performed such work to cover the work included under the Payment Request and all prior work Tenant was required to pay for before utilizing the Tenant Improvements Allowance.

Notwithstanding anything herein to the contrary, the Tenant Improvements Allowance must be requested in writing by Tenant, if at all, in accordance with this paragraph on or before the date that is one year following the Effective Date of this Amendment, and any portion not requested by such date may no longer be utilized by Tenant and shall be deemed forfeited to Landlord.

2.2.1 Final Retention. Subject to the provisions of this Tenant Work Letter, a check for the Final Retention payable to Tenant shall be delivered by Landlord to Tenant not later than thirty (30) days following the completion of construction of the Expansion Premises, provided that (i) Tenant delivers to Landlord properly executed mechanics lien releases in compliance with the applicable laws in the state where the Building is located, (ii) Landlord has reasonably determined that no defective work exists which adversely affects the mechanical, electrical, plumbing, heating, ventilating and air conditioning, life-safety or other systems of the Building, the curtain wall of the Building, the structure or exterior appearance of the Building, or any other tenant's use of such other tenant's leased premises in the Building and (iii) Architect delivers to Landlord a certificate, in a form reasonably acceptable to Landlord, certifying that the construction of the Tenant Improvements in the Expansion Premises has been substantially completed.

3. CONSTRUCTION DOCUMENTS

3.1 Selection of Architect/Construction Documents. Landlord consents to Tenant retaining Integrated Design, PA (collectively, the "Architect") to prepare the "Construction Documents," as that term is defined in this Section 3.1 for the Tenant Improvements. Tenant shall also retain the engineering consultants designated by Landlord (the "Engineers") to prepare all plans and engineering working drawings relating to the structural, mechanical, electrical, plumbing, HVAC and lifesafety work of the Tenant Improvements. The plans and drawings to be prepared by Architect and the Engineers hereunder shall be known collectively as the "Construction Documents." All Construction Documents shall reasonably comply with the drawing format and specifications as reasonably determined by Landlord, and shall be subject to Landlord's reasonable approval. Tenant and Architect shall verify, in the field, the dimensions and conditions as shown on the relevant portions of the base building plans, and Tenant and Architect shall be solely responsible for the same, and Landlord shall have no responsibility in connection therewith. Landlord's review of the Construction Documents as set forth in this Section 3, shall be for its sole purpose and shall not imply Landlord's review of the same, or obligate Landlord to review the same, for quality, design, Code compliance or other like matters. Accordingly, notwithstanding that any Construction Documents are reviewed by Landlord or its space planner, architect, engineers and consultants, and notwithstanding any advice or assistance which may be rendered to Tenant by Landlord or Landlord's space planner, architect, engineers, and consultants, Landlord shall have no liability whatsoever in connection therewith and shall not be responsible for any omissions or errors contained in the Construction Documents. Landlord may hire an architectural firm to conduct a peer review, and the fees associated with this peer review shall be paid from the Landlord's Project Oversight Fee and shall not result in an additional charge to Tenant.

Landlord has no obligation to approve or perform any Tenant Change or any Tenant Improvements not shown on the plans previously approved by Landlord and Tenant or reasonably inferable therefrom if, in Landlord's reasonable judgment, such Tenant Improvements (i) would materially increase the cost of performing any other work in the Building, not including the Tenant Improvements, unless in each case Tenant agrees to pay such costs based on

Landlord's Change Estimate Notice (as defined below), (ii) are incompatible with the design, quality, equipment or systems of the Building or otherwise require a change to the existing Building systems or structure, each in a manner that would not otherwise be required in connection with the improvements contemplated by the Fit Plan (as defined below), (iii) is not consistent with the existing quality and nature of the Building, or (iv) otherwise do not comply with the provisions of the Lease.

3.2 Final Space Plan. Tenant has approved the preliminary space plan prepared by the Architect attached as Attachment 1 hereto (the "Fit Plan"). Tenant shall use commercially reasonable efforts to cause the Architect to prepare a space plan for the Expansion Premises which space plan shall be reasonably consistent with the Fit Plan and shall include a layout and designation of all labs, offices, rooms and other partitioning, their intended use, and equipment to be contained therein, and shall deliver the space plan to Landlord and Tenant for their approval. Landlord and Tenant shall review and provide any changes to the space plan within five (5) Business Days of receipt thereof. Once Landlord and Tenant approve the final space plan, the space plan shall be considered final (the "Final Space Plan").

3.3 Construction Documents. Tenant shall cause the Architect to complete final Construction Documents consistent with the Final Space Plan and shall submit the same to Landlord and Tenant for their approval. Landlord and Tenant shall review and provide any changes to the construction documents within five (5) Business Days of receipt thereof, and the Tenant shall use reasonable efforts to cause the Architect to prepare and circulate modified documents within five (5) Business Days of its receipt of any requested changes from Tenant or Landlord. Such process of submittal and response within the time frame specified in the preceding sentence shall continue until each of Landlord and Tenant gives written approval to such documents, and the Construction Documents shall be considered final once approved by the Landlord and the Tenant. In no event may either Tenant or Landlord require any changes that are inconsistent with the Final Space Plan. The Construction Documents shall comply with Applicable Laws existing on the date of this Tenant Work Letter and which may be enacted prior to approval of completed Construction Documents. Subject to the provisions of Sections 3.1 and 5.4 of this Work Letter, Tenant may, from time to time, by written request to Landlord on a form reasonably specified by Landlord ("Tenant Change"), request a change in the Tenant Improvements shown on the Construction Documents, which approval shall not be unreasonably withheld or conditioned, and shall be granted or denied within five (5) Business Days after delivery of such Tenant Change to Landlord.

3.4 Permits. The Construction Documents as approved (or deemed approved) pursuant to Section 3.3 shall be the "Approved Working Drawings". Following approval or deemed approval of the Cost Proposal, as described below, Tenant shall promptly thereafter submit or cause to be submitted, the Approved Working Drawings to the appropriate municipal authorities for all applicable building permits necessary to allow "Contractor," as that term is defined in Section 4.1, below, to commence and fully complete the construction of the applicable Tenant Improvements (the "Permits").

3.5 Time Deadlines. Intentionally omitted.

4. CONSTRUCTION OF THE TENANT IMPROVEMENTS

4.1 Contractor. A contractor designated by Tenant and reasonably approved by Landlord ("Contractor") shall construct the Tenant Improvements.

4.2 Cost Proposal. After the Approved Working Drawings are approved by Landlord and Tenant, Tenant shall provide Landlord with a cost proposal (or cost proposals) in accordance with the Approved Working Drawings for Landlord's approval, which approval shall not be unreasonably withheld, which cost proposal(s) shall include, as nearly as possible, the cost of all Tenant Improvements Allowance Items to be incurred by Tenant in connection with the design and construction of the Tenant Improvements (the "Cost Proposal"). Tenant will consult with Landlord prior to approving the contractors to whom it will be bid and Landlord may review bid packages at Landlord's written request. The date on which Landlord approves the Cost Proposal shall be known hereafter as the "Cost Proposal Delivery Date".

4.3 Construction of Tenant Improvements by Contractor.

4.3.1 Intentionally Deleted.

4.3.2 Tenant's Retention of Contractor. Tenant shall independently retain Contractor to construct the Tenant Improvements in accordance with the applicable Approved Working Drawings and the applicable Cost Proposal. Landlord shall be entitled to review the Tenant's construction contract with the Contractor upon Landlord's written request. Tenant shall be responsible to ensure the Contractor performs the construction work in a good and workmanlike manner and shall endeavor to oversee the Contractor's performance of its work to protect Landlord from construction defects.

5. COMPLETION OF THE TENANT IMPROVEMENTS; LEASE COMMENCEMENT DATE

5.1 Substantial Completion. Tenant shall give Landlord at least twenty (20) days prior written notice of the date that Tenant reasonably anticipates that the Tenant Improvements will be Substantially Complete (as defined below). For purposes of this Lease, "Substantial Completion" shall occur upon the completion of the last of the following to occur: (i) the completion of construction of the Tenant Improvements substantially pursuant to the Approved Working Drawings for such Tenant Improvements (each as reasonably determined by Tenant and Architect), with the exception of any punch list items which do not impair Tenant's ability to occupy the Expansion Premises for their contemplated use, (ii) the acquisition of a certificate of occupancy or its legal equivalent allowing occupancy of the Expansion Premises (a "Sign Off"), and (iii) delivery of a certificate of substantial completion from the Architect confirming the matters set forth in the foregoing clause (i). In the event that the Sign Off is not a final certificate of occupancy, Tenant shall diligently prosecute the work necessary to achieve a full certificate of occupancy and use commercially reasonable efforts to obtain such full certificate of occupancy as soon as reasonably practicable following Substantial Completion.

5.2 Intentionally omitted.

5.3 Walk-through and Punchlist. After the Tenant Improvements are Substantially Completed and prior to Tenant's move-in into the Expansion Premises, following two (2) days' advance written notice from Tenant to Landlord, Tenant shall cause the Contractor to inspect the Expansion Premises with a representative of Landlord and complete a punch list of unfinished items of the Tenant Improvements. After Landlord and Tenant have mutually agreed upon the punch list, authorized representatives for Landlord and Tenant shall execute said punch list. The items listed on such punch list shall be completed by the Contractor within thirty (30) days after the approval of such punch list or as soon thereafter as reasonably practicable, provided that in the event a punch list item reasonably requires longer than thirty (30) days to complete, then Tenant shall cause Contractor to commence the completion of such particular item within thirty (30) days and diligently pursue the same to completion. The terms of this Section 5.3 will not affect the occurrence of the Substantial Completion of the Expansion Premises or the occurrence of the Expansion Premises Rent Commencement Date.

5.4 Tenant Changes. Landlord shall reasonably approve any Tenant Change on the condition that Tenant shall pay in full, in advance (or cause to be paid in full from the Tenant Improvements Allowance), any and all additional costs or expenses associated with the approval of said Tenant Change.

5.5 Delay Not Caused by Parties. Neither the Landlord nor Tenant shall be considered to be in default of the provisions of this Tenant Work Letter for delays in performance due to Force Majeure.

6. MISCELLANEOUS

6.1 Tenant's Entry Into the Expansion Premises. As a condition to Tenant's entry into the Expansion Premises, Tenant shall comply with and perform, and shall cause its employees, agents, contractors, subcontractors, material suppliers and laborers to comply with and perform, all of Tenant's insurance and indemnity obligations and other obligations governing the conduct of Tenant at the Property under this Lease.

6.2 Tenant's Representative. Tenant has designated Sinu Bhandaru as its sole representative with respect to the matters set forth in this Tenant Work Letter, who, until further notice to Landlord, shall have full authority and responsibility to act on behalf of the Tenant as required in this Tenant Work Letter.

6.3 Landlord's Representative. Landlord has designated Jim McGlade as its sole representative with respect to the matters set forth in this Tenant Work Letter, who, until further notice to Tenant, shall have full authority and responsibility to act on behalf of the Landlord as required in this Tenant Work Letter.

6.4 Intentionally omitted.

6.5 General. This Work Letter shall not be deemed applicable to any additional space added to the Expansion Premises at any time or from time to time, whether by any options under the Lease or otherwise, or to any portion of the Expansion Premises or any additions to the Expansion Premises in the event of a renewal or extension of the original Lease Term, whether by any options under the Lease or otherwise, unless and to the extent expressly provided in the Lease or any amendment or supplement to the Lease that such additional space is to be delivered to Tenant in the same condition the initial Expansion Premises is to be delivered.

6.6 Insurance. In addition to the requirements of Article 8.5 and Article 10 of the Lease, prior to the commencement of the Tenant Improvements, Tenant shall provide Landlord with evidence that Tenant carries Builder's All Risk insurance in an amount reasonably approved by Landlord covering the construction of such Tenant Improvements, and such other insurance as Landlord may reasonably require, it being understood and agreed that all of such Tenant Improvements shall be insured by Tenant pursuant to Article 10 of the Lease immediately upon completion thereof. In addition, Tenant's contractors, subcontractors, and architects shall be required to carry Commercial General Liability Insurance in an amount reasonably approved by Landlord and otherwise in accordance with the requirements of Article 10 of the Lease and such general liability insurance shall name the Landlord Parties as additional insureds. In addition, Tenant's contractors and subcontractors shall be required to carry workers compensation insurance with a waiver of subrogation in favor of Landlord Parties.

ATTACHMENT 1

FIT PLAN

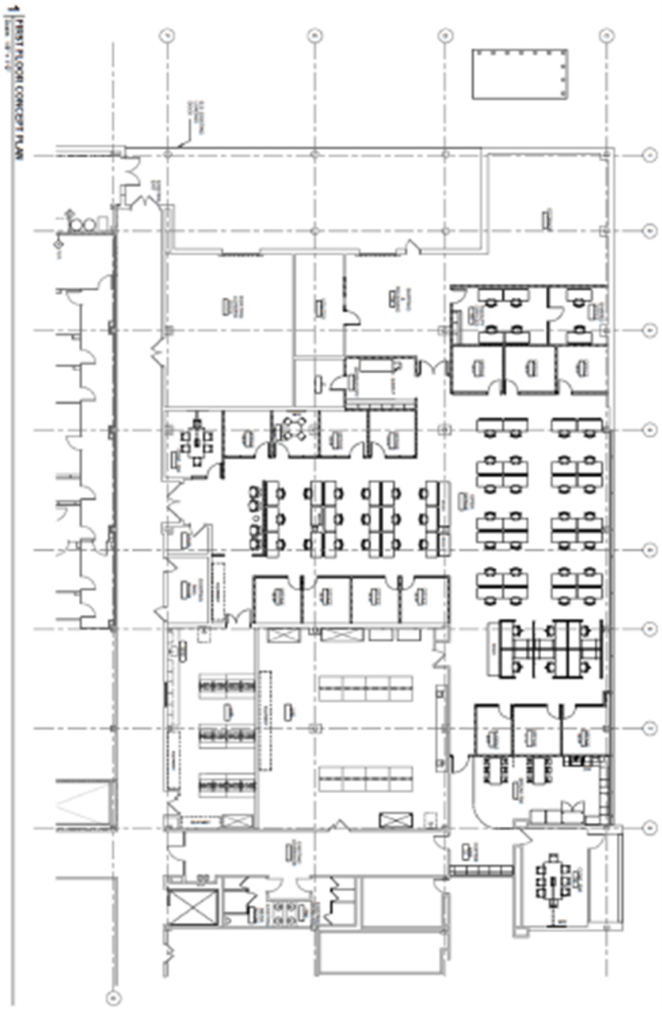
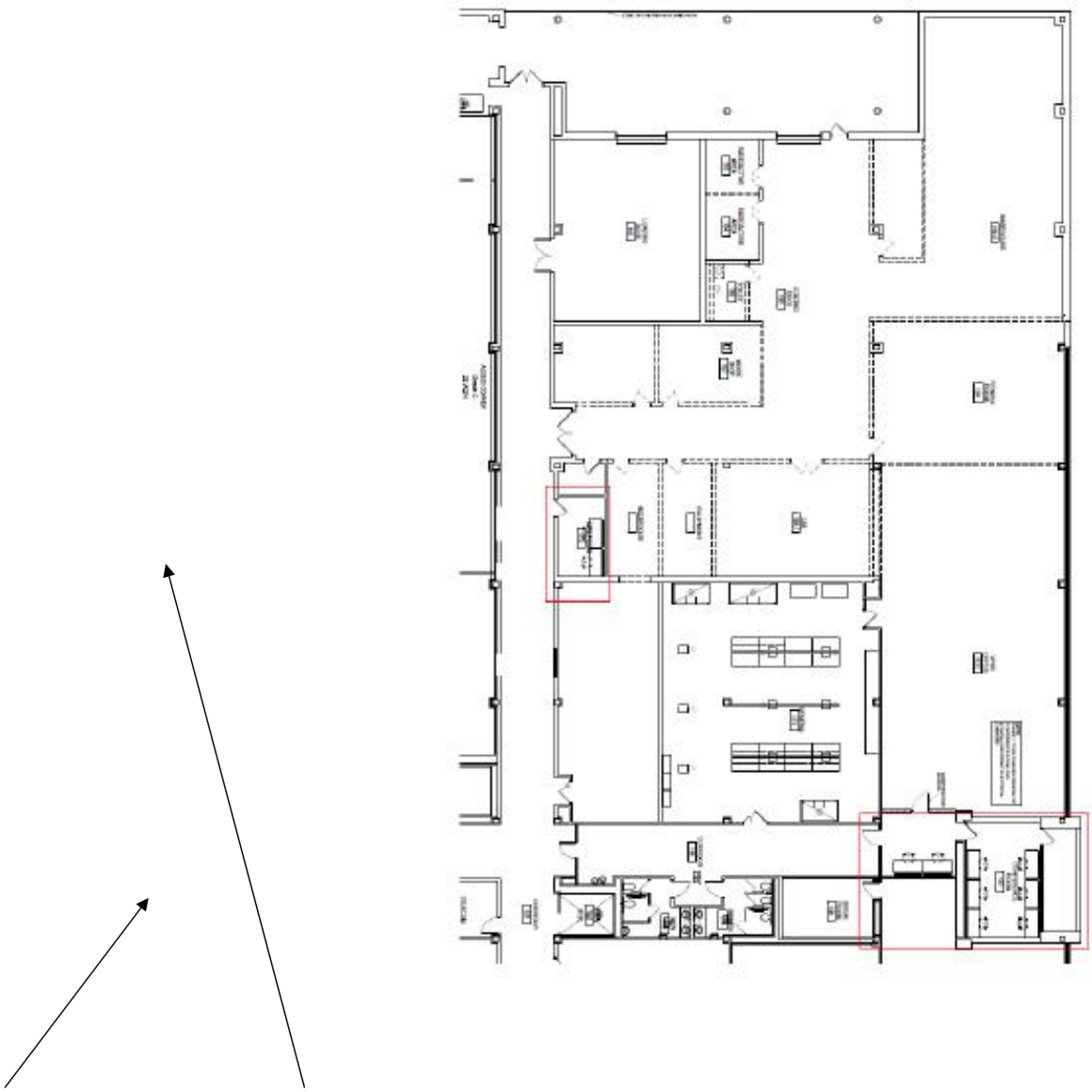


EXHIBIT D

LIMITED OCCUPANCY SPACE



Limited Occupancy Space

SECOND AMENDMENT TO LEASE

THIS SECOND AMENDMENT TO LEASE (this "***Amendment***") is made and entered into as of the 13th day of March, 2020 (the "***Effective Date***"), by and between **DURHAM TW ALEXANDER, LLC**, a Delaware limited liability company ("***Landlord***"), and **PRECISION BIOSCIENCES, INC.**, a Delaware corporation (formerly a North Carolina corporation) ("***Tenant***").

STATEMENT OF PURPOSE

WHEREAS, Landlord and Tenant entered into that certain Lease dated October 2, 2018 ("***Initial Lease***") as amended by that certain First Amendment to Lease dated December 23, 2019 ("***First Amendment***" and together with the Initial Lease, the "***Existing Lease***"), for certain premises containing approximately 33,635 rentable square feet on the first (1st) floor (the "***Existing Premises***") located in the building known as Biopoint Innovation Labs located at 20 TW Alexander Drive, Research Triangle Park, North Carolina 27709 (the "***Building***"), as more particularly described in the Lease.

WHEREAS, Landlord and Tenant desire to amend the terms of the Existing Lease: (i) to expand the Existing Premises, and (ii) to modify certain other terms of the Existing Lease. For purposes hereof, the Lease as amended by this Amendment is referred to as the "***Lease***." All capitalized terms not otherwise defined herein shall have the meanings set forth in the Existing Lease.

NOW, THEREFORE, in consideration of the statement of purpose, the mutual covenants contained herein and other valuable consideration, the receipt of which is hereby acknowledged, the parties hereto agree as follows:

12. **Recitals**. The recitals shall form a part of this Amendment.

13. **Expansion of the Premises**. As of the Effective Date, Exhibit A to the First Amendment is hereby deleted in its entirety and replaced with Exhibit A attached hereto, and Section 2(a) of the First Amendment is hereby deleted in its entirety and replaced with the following:

(a) Tenant desires to expand the Existing Premises to include an additional approximately 16,532 rentable square feet commonly known as Suite 140 along with an adjoining mailroom located on the first (1st) floor of the Building, all as further shown on **Exhibit A** attached hereto and incorporated herein by reference (the "***Expansion Premises***"). For avoidance of ambiguity, Section 1.2 of the Existing Lease shall also apply to the measurement of the Expansion Premises. Effective as of the Expansion Premises Rent Commencement Date (as defined in Section 2(b) of the First Amendment), the Existing Premises shall be expanded by adding the Expansion Premises and the term "Premises" under the Lease shall be redefined to be approximately 33,828 rentable square feet of space (the "***Revised Premises***").

14. **Base Rent**. Tenant shall continue pay Base Rent for the Existing Premises in accordance with Section 4(a) of the First Amendment. As of the Effective Date Section 4(b) of the First Amendment which provides the Base Rent for the Expansion Premises is hereby deleted in its entirety and replaced with the following:

(b) Notwithstanding anything contained in the Lease to the contrary, commencing on the Expansion Premises Rent Commencement Date and continuing through the First Extension Term Expiration Date, Tenant shall, at the time and in the manner provided in the Lease, pay to

Landlord as Base Rent for the Expansion Premises, the amounts set forth in the following rent schedule, plus any applicable tax thereon:

Time Period*	Annual Base Rent	Monthly Installment of Base Rent	Annual Base Rent per Rentable Square Foot
07/01/2020 - 06/30/2021**	$462,896.04	$38,574.67	$28.00
07/01/2021 - 06/30/2022	$476,782.92	$39,731.91	$28.84
07/01/2022 - 06/30/2023	$491,165.76	$40,930.48	$29.71
07/01/2023 - 06/30/2024	$505,879.20	$42,156.60	$30.60
07/01/2024 - 06/30/2025	$520,923.36	$43,410.28	$31.51
07/01/2025 - 06/30/2026	$536,628.72	$44,719.06	$32.46
07/01/2026 - 06/30/2027	$552,664.80	$46,055.40	$33.43
07/01/2027 - 08/31/2027	$569,362.08	$47,446.84	$34.44

*Note: Notwithstanding the above table, the dates of the time periods set forth therein will be adjusted based on the actual Expansion Premises Rent Commencement Date if such date occurs on a date earlier than July 1, 2020, but the final date shall remain the same.

Note: Provided Tenant is not in monetary default of the terms of this Lease, after expiration of any applicable notice and cure period, Tenant shall have no obligation to pay any Base Rent attributable to: (i) the first two (2) months of for the Expansion Premises, and only the Expansion Premises, following the Expansion Premises Rent Commencement Date (the "*Expansion Premises Abatement Period***"). Tenant shall be obligated to pay all of Tenant's Share of Direct Expenses attributable to the Expansion Premises during the Expansion Premises Abatement Period.

15. **Additional Rent**. The term "Tenant's Share" under the Lease shall be redefined to be 22.71% as of the Expansion Premises Rent Commencement Date.

16. **Security Deposit**. Prior to the Effective Date, Tenant shall provide an additional One Thousand Eight Hundred One and 36/100 Dollars ($1,801.36) (which is four (4) months Base Rent for the Expansion Premises at a rate of $38,574.67 per month less the Security Deposit required under Section 7 of the First Amendment) to be added to the Security Deposit under the Lease, which shall mean the total Security Deposit amount required under the Lease shall be Three Hundred Four Thousand One Hundred Ninety-Seven and 36/100 Dollars ($304,197.36) (the "***Revised Premises Security Deposit***"). For the avoidance of doubt, the Revised Premises Security Deposit shall be held pursuant to Article 21 of the Initial Lease and this Section 5 shall control future reductions of the Revised Premises Security Deposit. So long as Tenant has not been in default beyond any applicable notice and cure period at any time during the Term of the Lease, then at the end of the third (3rd) Lease Year, the Revised Premises Security Deposit shall be reduced to Two Hundred Twenty-Eight Thousand One Hundred Forty-Eight and 02/100 Dollars ($228,148.02). So long as Tenant has not been in default beyond any applicable notice and cure period at any time during the Term of the Lease, then at the end of the fifth (5th) Lease Year, the Revised Premises Security Deposit shall be reduced to One Hundred Fifty-Two Thousand Ninety-Eight and 68/100 Dollars ($152,098.68) for the remainder of the Lease Term, as extended.

17. **Tenant Improvements Allowance**. As of the Effective Date, the term "Tenant Improvements Allowance" under Section 2.1 of Exhibit C to the First Amendment shall be redefined to be **$909,260.00** for the Expansion Premises (*i.e.*, **$55.00** per rentable square foot of the Expansion Premises).

18. **Updated Fit Plan.** As of the Effective Date, the Fit Plan attached as Attachment 1 to Exhibit C of the First Amendment is hereby deleted and replaced with **Attachment 1** attached to this Amendment.

19. **Brokers**. Landlord and Tenant hereby warrant to each other that it has had no dealings with any real estate broker or agent in connection with the negotiation of this Amendment, excepting only the real estate brokers or agents specified in Section 13 of the Initial Lease Summary (the "**Brokers**"), and that it knows of no other real estate broker or agent which represented said party who is entitled to a commission in connection with this Amendment. Landlord and Tenant each agree to indemnify and defend each other against and hold the indemnified party harmless from any and all claims, demands, losses, liabilities, lawsuits, judgments, costs and expenses (including without limitation reasonable attorneys' fees) with respect to any leasing commission or equivalent compensation alleged to be owing on account of any dealings with any real estate broker or agent, other than the Brokers, occurring by, through, or under the indemnifying party.

20. **Counterparts/Signatures**. This Amendment may be executed in counterparts. All executed counterparts shall constitute one agreement, and each counterpart shall be deemed an original. The parties hereby acknowledge and agree that electronic signatures, facsimile signatures or signatures transmitted by electronic mail in so-called "pdf" format shall be legal and binding and shall have the same full force and effect as if an original of this Amendment had been delivered. Landlord and Tenant (i) intend to be bound by the signatures (whether original, faxed or electronic) on any document sent by facsimile or electronic mail, (ii) are aware that the other party will rely on such signatures, and (iii) hereby waive any defenses to the enforcement of the terms of this Amendment based on the foregoing forms of signature.

21. **Miscellaneous**. This Amendment shall become effective only upon full execution and delivery of this Amendment by Landlord and Tenant. This Amendment contains the parties' entire agreement regarding the subject matter covered by this Amendment, and supersedes all prior correspondence, negotiations, and agreements, if any, whether oral or written, between the parties concerning such subject matter. There are no contemporaneous oral agreements, and there are no representations or warranties between the parties not contained in this Amendment. This Amendment shall be construed and enforced in accordance with the laws of the State of North Carolina. Except as modified by this Amendment, the terms and provisions of the Lease shall remain in full force and effect, and the Lease, as modified by this Amendment, shall be binding upon and shall inure to the benefit of the parties hereto, their successors and permitted assigns.

[***Signature Page Follows***]

[***The remainder of this page has been intentionally left blank***]

LANDLORD AND TENANT enter into this Amendment as of the Effective Date above.

LANDLORD:

DURHAM TW ALEXANDER, LLC,
A DELAWARE LIMITED LIABILITY COMPANY

By:	/s/Jamison N. Peschel
Name:	JAMISON PESCHEL
Title:	Authorized Signatory

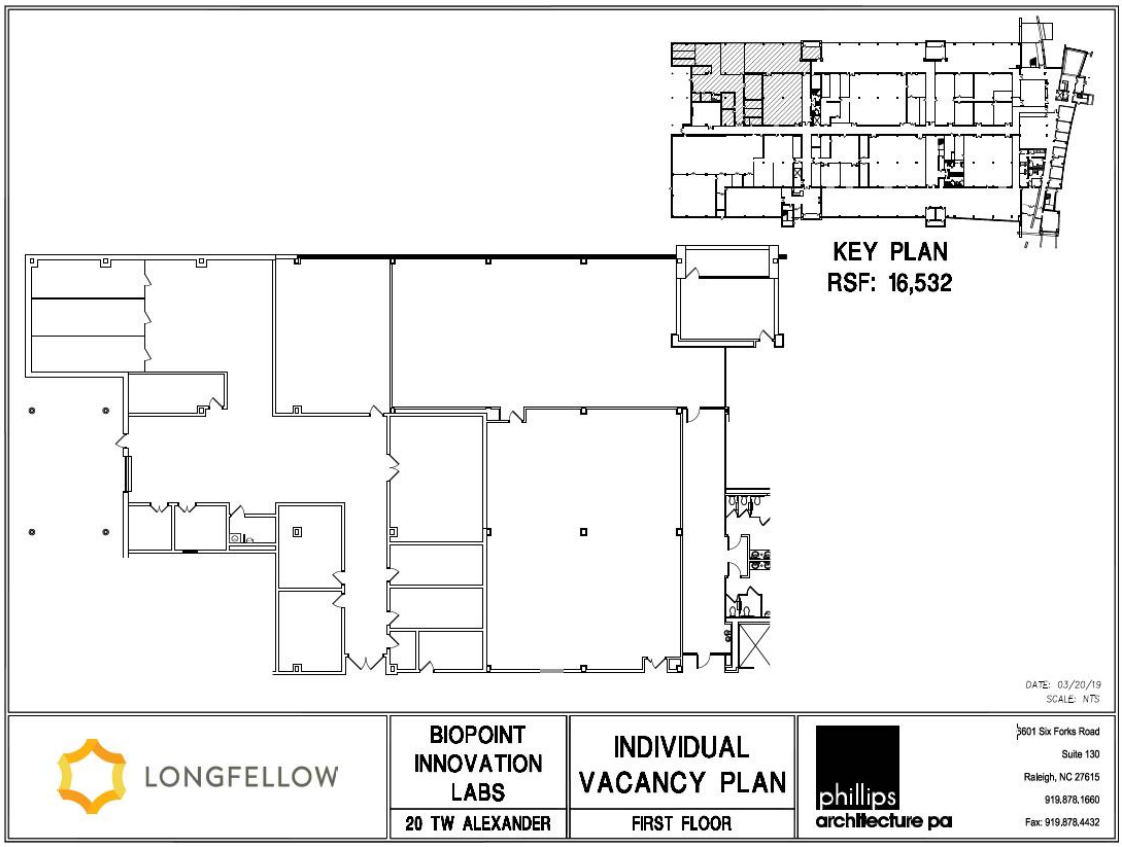
ENANT:

PRECISION BIOSCIENCES, INC.,
a Delaware corporation

By:	/s/ Sinu Bhandaru
Name:	Sinu Bhandaru
Title:	Vice President Operations & IT

EXHIBIT A

THE EXPANSION PREMISES



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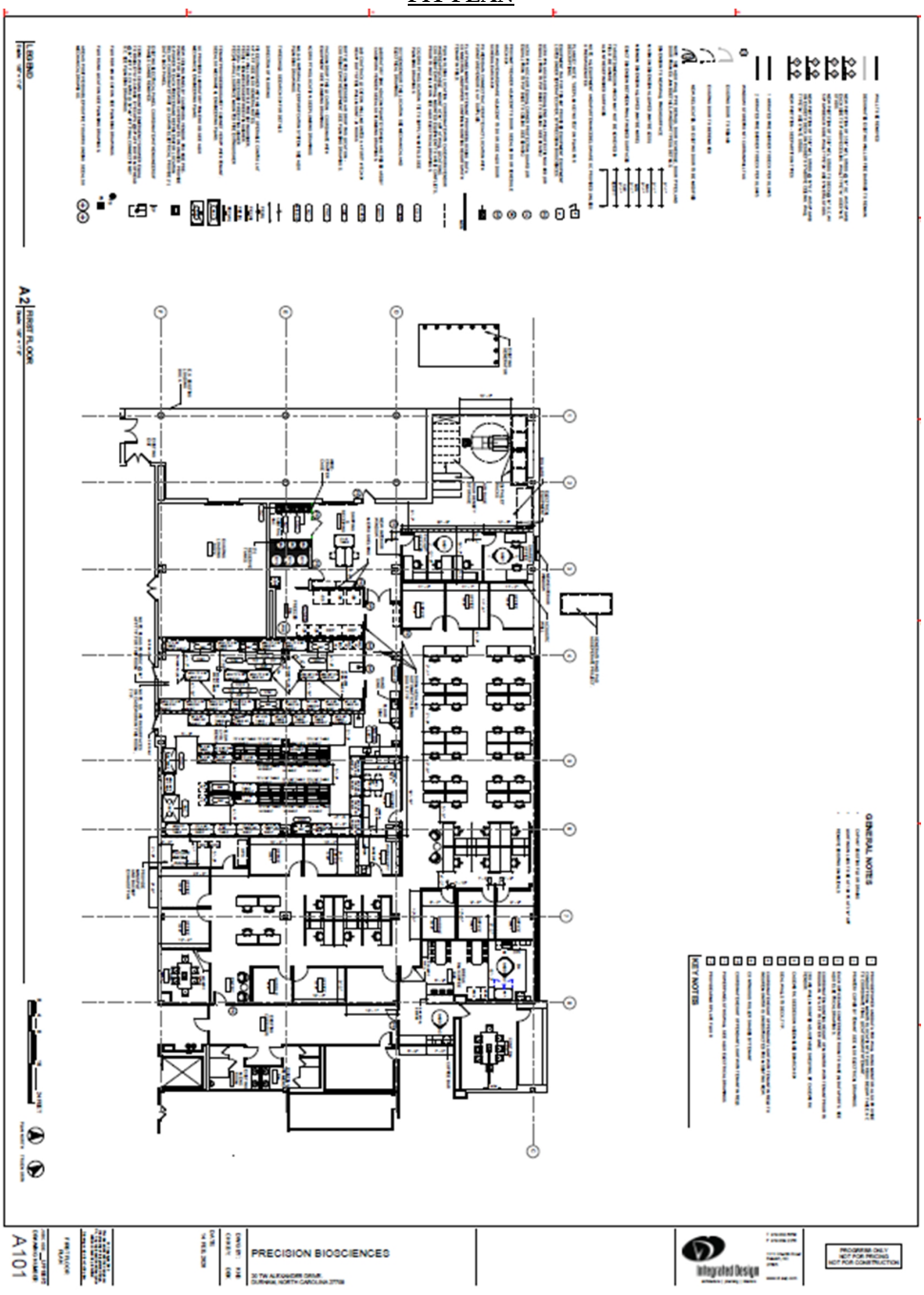
ATTACHMENT 1

FIT PLAN



THIRD AMENDMENT TO LEASE

THIS THIRD AMENDMENT TO LEASE (this "***Amendment***") is made and entered into as of the 15th day of June, 2020 (the "***Effective Date***"), by and between **DURHAM TW ALEXANDER, LLC**, a Delaware limited liability company ("***Landlord***"), and **PRECISION BIOSCIENCES, INC.**, a Delaware corporation (formerly a North Carolina corporation) ("***Tenant***").

STATEMENT OF PURPOSE

WHEREAS, Landlord and Tenant entered into that certain Lease dated October 2, 2018 ("***Initial Lease***") as amended by that certain First Amendment to Lease dated December 23, 2019 (***"First Amendment")*** and as further amended by that certain Second Amendment to Lease dated March 13, 2020 ***("Second Amendment")*** (as amended, the "***Existing Lease***"), for certain premises containing approximately 33,828 rentable square feet on the first (1st) floor (the "***Premises***") located in the building known as Biopoint Innovation Labs located at 20 TW Alexander Drive, Research Triangle Park, North Carolina 27709 (the "***Building***"), as more particularly described in the Lease.

WHEREAS, Landlord and Tenant desire to amend the terms of the Existing Lease: (i) to extend the date by which Tenant must utilize the Tenant Improvements Allowance, as defined in the First Amendment, and (ii) to modify certain other terms of the Existing Lease. For purposes hereof, the Lease as amended by this Amendment is referred to as the "***Lease***." All capitalized terms not otherwise defined herein shall have the meanings set forth in the Existing Lease.

NOW, THEREFORE, in consideration of the statement of purpose, the mutual covenants contained herein and other valuable consideration, the receipt of which is hereby acknowledged, the parties hereto agree as follows:

22. **Recitals**. The recitals shall form a part of this Amendment.

23. **Extension of the Tenant Improvements Allowance Disbursement Deadline**. Due to various delays in the performance of the Tenant Improvements, as defined in the First Amendment, Landlord and Tenant hereby agree that the deadline for Tenant to request disbursements from the Tenant Improvement Allowance under Section 2.2 of Exhibit C of the First Amendment shall be extended until June 30, 2021. For purposes of clarity, Landlord also hereby acknowledges and agrees that Tenant's delayed occupancy of the Premises and construction timeline does not constitute abandonment under Section 19.1.3 of the Lease.

24. **Counterparts/Signatures**. This Amendment may be executed in counterparts. All executed counterparts shall constitute one agreement, and each counterpart shall be deemed an original. The parties hereby acknowledge and agree that electronic signatures, facsimile signatures or signatures transmitted by electronic mail in so-called "pdf" format shall be legal and binding and shall have the same full force and effect as if an original of this Amendment had been delivered. Landlord and Tenant (i) intend to be bound by the signatures (whether original, faxed or electronic) on any document sent by facsimile or electronic mail, (ii) are aware that the other party will rely on such signatures, and (iii) hereby waive any defenses to the enforcement of the terms of this Amendment based on the foregoing forms of signature.

25. **Miscellaneous**. This Amendment shall become effective only upon full execution and delivery of this Amendment by Landlord and Tenant. This Amendment contains the parties' entire agreement regarding the subject matter covered by this Amendment, and supersedes all prior correspondence, negotiations, and agreements, if any, whether oral or written, between the parties concerning such subject matter. There are no contemporaneous oral agreements, and there are no representations or warranties between the parties not contained in this Amendment. This Amendment shall be construed and enforced in accordance with the laws of the State of North Carolina. Except as modified by this Amendment, the terms and provisions of the Lease shall remain in full force and effect, and the Lease, as modified by this Amendment, shall be binding upon and shall inure to the benefit of the parties hereto, their successors and permitted assigns.

[***Signature Page Follows***]

[***The remainder of this page has been intentionally left blank***]

LANDLORD AND TENANT enter into this Amendment as of the Effective Date above.

LANDLORD:

DURHAM TW ALEXANDER, LLC,
A DELAWARE LIMITED LIABILITY COMPANY

By: /s/ Jamison Peschel
Name: Jamison Peschel
Title: Authorized Signatory

TENANT:

PRECISION BIOSCIENCES, INC.,
a Delaware corporation

By: /s/ Sinu Bhandaru
Name: Sinu Bhandaru
Title: VP Operations & IT

FOURTH AMENDMENT TO LEASE

THIS FOURTH AMENDMENT TO LEASE (this "***Amendment***") is made and entered into as of the _4__ day of May, 2021 (the "***Effective Date***"), by and between **DURHAM TW ALEXANDER, LLC**, a Delaware limited liability company ("***Landlord***"), and **PRECISION BIOSCIENCES, INC.**, a Delaware corporation (formerly a North Carolina corporation) ("***Tenant***").

STATEMENT OF PURPOSE

WHEREAS, Landlord and Tenant entered into that certain Lease dated October 2, 2018 ("***Initial Lease***"), as amended by that certain First Amendment to Lease dated December 23, 2019 (***"First Amendment"***), as further amended by that certain Second Amendment to Lease dated March 13, 2020 (***"Second Amendment***"), and as further amended by that certain Third Amendment to Lease dated June 15, 2020 (***"Third Amendment***") (as amended, the "***Existing Lease***"), for certain premises containing approximately 33,828 rentable square feet on the first (1st) floor (the "***Premises***") located in the building known as Biopoint Innovation Labs located at 20 TW Alexander Drive, Research Triangle Park, North Carolina 27709 (the "***Building***"), as more particularly described in the Lease.

WHEREAS, Landlord and Tenant desire to amend the terms of the Existing Lease: (i) to extend the date by which Tenant must utilize the Tenant Improvements Allowance, as defined in the First Amendment, and (ii) to modify certain other terms of the Existing Lease. For purposes hereof, the Lease as amended by this Amendment is referred to as the "***Lease***." All capitalized terms not otherwise defined herein shall have the meanings set forth in the Existing Lease.

NOW, THEREFORE, in consideration of the statement of purpose, the mutual covenants contained herein and other valuable consideration, the receipt of which is hereby acknowledged, the parties hereto agree as follows:

26. **Recitals**. The recitals shall form a part of this Amendment.

27. **Extension of the Tenant Improvements Allowance Disbursement Deadline**. Due to various delays in the performance of the Tenant Improvements, as defined in the First Amendment, Landlord and Tenant hereby agree that the deadline for Tenant to request disbursements from the Tenant Improvement Allowance under Section 2.2 of Exhibit C of the First Amendment shall be extended until December 30, 2021. For purposes of clarity, Landlord also hereby acknowledges and agrees that Tenant's delayed occupancy of the Premises and construction timeline does not constitute abandonment under Section 19.1.3 of the Lease.

28. **Counterparts/Signatures**. This Amendment may be executed in counterparts. All executed counterparts shall constitute one agreement, and each counterpart shall be deemed an original. The parties hereby acknowledge and agree that electronic signatures, facsimile signatures or signatures transmitted by electronic mail in so-called "pdf" format shall be legal and binding and shall have the same full force and effect as if an original of this Amendment had been delivered. Landlord and Tenant (i) intend to be bound by the signatures (whether original, faxed or electronic) on any document sent by facsimile or electronic mail, (ii) are aware that the other party will rely on such signatures, and (iii) hereby waive any defenses to the enforcement of the terms of this Amendment based on the foregoing forms of signature.

29. **Miscellaneous**. This Amendment shall become effective only upon full execution and delivery of this Amendment by Landlord and Tenant. This Amendment contains the parties' entire agreement regarding the subject matter covered by this Amendment, and supersedes all prior correspondence, negotiations, and agreements, if any, whether oral or written, between the parties concerning such subject matter. There are no contemporaneous oral agreements, and there are no representations or warranties between the parties not contained in this Amendment. This Amendment shall be construed and enforced in accordance with the laws of the State of North Carolina. Except as modified by this Amendment, the terms and provisions of the Lease shall remain in full force and effect, and the

Lease, as modified by this Amendment, shall be binding upon and shall inure to the benefit of the parties hereto, their successors and permitted assigns.

[***Signature Page Follows***]

[***The remainder of this page has been intentionally left blank***]

LANDLORD AND TENANT enter into this Amendment as of the Effective Date above.

LANDLORD:

DURHAM TW ALEXANDER, LLC,
A DELAWARE LIMITED LIABILITY COMPANY

By:	/s/ Adam Sichol
Name:	Adam Sichol
Title:	Authorized Signatory
Date:	May 11, 2021

TENANT:

PRECISION BIOSCIENCES, INC.,
a Delaware corporation

By:	/s/ Sinu Bhandaru
Name:	Sinu Bhandaru
Title:	Vice President Operations & IT

FIFTH AMENDMENT TO LEASE

THIS FIFTH AMENDMENT TO LEASE (this "***Amendment***") is made and entered into as of the 13 day of December, 2021 (the "***Effective Date***"), by and between **DURHAM TW ALEXANDER, LLC**, a Delaware limited liability company ("***Landlord***"), and **PRECISION BIOSCIENCES, INC.**, a Delaware corporation (formerly a North Carolina corporation) ("***Tenant***").

STATEMENT OF PURPOSE

WHEREAS, Landlord and Tenant entered into that certain Lease dated October 2, 2018 ("***Initial Lease***"), as amended by that certain First Amendment to Lease dated December 23, 2019 (***"First Amendment"***), as further amended by that certain Second Amendment to Lease dated March 13, 2020 (***"Second Amendment***"), as further amended by that certain Third Amendment to Lease dated June 15, 2020 (***"Third Amendment***"), and as further amended by that certain Fourth Amendment to Lease dated May 4, 2021 (***"Fourth Amendment***") (as amended, the "***Existing Lease***"), for certain premises containing approximately 33,828 rentable square feet on the first (1st) floor (the "***Premises***") located in the building known as Biopoint Innovation Labs located at 20 TW Alexander Drive, Research Triangle Park, North Carolina 27709 (the "***Building***"), as more particularly described in the Lease.

WHEREAS, Landlord and Tenant desire to amend the terms of the Existing Lease: (i) to extend the date by which Tenant must utilize the Tenant Improvements Allowance, as defined in the First Amendment, and (ii) to modify certain other terms of the Existing Lease. For purposes hereof, the Lease as amended by this Amendment is referred to as the "***Lease***." All capitalized terms not otherwise defined herein shall have the meanings set forth in the Existing Lease.

NOW, THEREFORE, in consideration of the statement of purpose, the mutual covenants contained herein and other valuable consideration, the receipt of which is hereby acknowledged, the parties hereto agree as follows:

30. **Recitals**. The recitals shall form a part of this Amendment.

31. **Extension of the Tenant Improvements Allowance Disbursement Deadline**. Due to various delays in the performance of the Tenant Improvements, as defined in the First Amendment, Landlord and Tenant hereby agree that the deadline for Tenant to request disbursements from the Tenant Improvement Allowance under Section 2.2 of Exhibit C of the First Amendment shall be extended until December 31, 2022 (the "***Second TIA Extension***"). For purposes of clarity, Landlord also hereby acknowledges and agrees that Tenant's delayed occupancy of the Premises and construction timeline does not constitute abandonment under Section 19.1.3 of the Lease.

32. **Counterparts/Signatures**. This Amendment may be executed in counterparts. All executed counterparts shall constitute one agreement, and each counterpart shall be deemed an original. The parties hereby acknowledge and agree that electronic signatures, facsimile signatures or signatures transmitted by electronic mail in so-called "pdf" format shall be legal and binding and shall have the same full force and effect as if an original of this Amendment had been delivered. Landlord and Tenant (i) intend to be bound by the signatures (whether original, faxed or electronic) on any document sent by facsimile or electronic mail, (ii) are aware that the other party will rely on such signatures, and (iii) hereby waive any defenses to the enforcement of the terms of this Amendment based on the foregoing forms of signature.

33. **Miscellaneous**. This Amendment shall become effective only upon full execution and delivery of this Amendment by Landlord and Tenant. This Amendment contains the parties' entire agreement regarding the subject matter covered by this Amendment, and supersedes all prior correspondence, negotiations, and agreements, if any, whether oral or written, between the parties concerning such subject matter. There are no contemporaneous oral agreements, and there are no representations or warranties between the parties not contained in this Amendment. This Amendment shall be construed and enforced in accordance with the laws of the State of North Carolina. Except as modified by this Amendment, the terms and provisions of the Lease shall remain in full force and effect, and the

Lease, as modified by this Amendment, shall be binding upon and shall inure to the benefit of the parties hereto, their successors and permitted assigns.

[***Signature Page Follows***]

[***The remainder of this page has been intentionally left blank***]

LANDLORD AND TENANT enter into this Amendment as of the Effective Date above.

LANDLORD:

DURHAM TW ALEXANDER, LLC,
A DELAWARE LIMITED LIABILITY COMPANY

By:	/s/Jessica Brock
Name:	Jessica Brock
Title:	Authorized Signatory
Date:	January 31, 2022

TENANT:

PRECISION BIOSCIENCES, INC.,
a Delaware corporation

By:	/s/Sinu Bhandaru
Name:	Sinu Bhandaru
Title:	VP, Operations and IT (24Jan2022)

SUBSIDIARIES OF PRECISION BIOSCIENCES, INC.

Legal Name of Subsidiary	**Jurisdiction of Organization**
Precision PlantSciences, Inc.	Delaware
Precision BioSciences UK Limited	England and Wales

Exhibit 23.1

CONSENT OF INDEPENDENT REGISTERED PUBLIC ACCOUNTING FIRM

We consent to the incorporation by reference in Registration Statement Nos. 333-230671 and 333-259369 on Form S-8 and Registration Statement No. 333-238857 on Form S-3 of our report dated March 15, 2022, relating to the financial statements of Precision BioSciences, Inc., appearing in this Annual Report on Form 10-K for the year ended December 31, 2021.

/s/ Deloitte & Touche LLP

Raleigh, North Carolina
March 15, 2022

Exhibit 31.1

CERTIFICATION PURSUANT TO
RULES 13a-14(a) AND 15d-14(a) UNDER THE SECURITIES EXCHANGE ACT OF 1934,
AS ADOPTED PURSUANT TO SECTION 302 OF THE SARBANES-OXLEY ACT OF 2002

I, Michael Amoroso, certify that:

1. I have reviewed this Annual Report on Form 10-K for the fiscal year ended December 31, 2021 of Precision BioSciences, Inc.;

2. Based on my knowledge, this report does not contain any untrue statement of a material fact or omit to state a material fact necessary to make the statements made, in light of the circumstances under which such statements were made, not misleading with respect to the period covered by this report;

3. Based on my knowledge, the financial statements, and other financial information included in this report, fairly present in all material respects the financial condition, results of operations and cash flows of the registrant as of, and for, the periods presented in this report;

4. The registrant's other certifying officer(s) and I are responsible for establishing and maintaining disclosure controls and procedures (as defined in Exchange Act Rules 13a-15(e) and 15d-15(e)) and internal control over financial reporting (as defined in Exchange Act Rules 13a-15(f) and 15d-15(f)) for the registrant and have:

   (a) Designed such disclosure controls and procedures, or caused such disclosure controls and procedures to be designed under our supervision, to ensure that material information relating to the registrant, including its consolidated subsidiaries, is made known to us by others within those entities, particularly during the period in which this report is being prepared;

   (b) Designed such internal control over financial reporting, or caused such internal control over financial reporting to be designed under our supervision, to provide reasonable assurance regarding the reliability of financial reporting and the preparation of financial statements for external purposes in accordance with generally accepted accounting principles;

   (c) Evaluated the effectiveness of the registrant's disclosure controls and procedures and presented in this report our conclusions about the effectiveness of the disclosure controls and procedures, as of the end of the period covered by this report based on such evaluation; and

   (d) Disclosed in this report any change in the registrant's internal control over financial reporting that occurred during the registrant's most recent fiscal quarter (the registrant's fourth fiscal quarter in the case of an annual report) that has materially affected, or is reasonably likely to materially affect, the registrant's internal control over financial reporting; and

5. The registrant's other certifying officer(s) and I have disclosed, based on our most recent evaluation of internal control over financial reporting, to the registrant's auditors and the audit committee of the registrant's board of directors (or persons performing the equivalent functions):

   (a) All significant deficiencies and material weaknesses in the design or operation of internal control over financial reporting which are reasonably likely to adversely affect the registrant's ability to record, process, summarize and report financial information; and

   (b) Any fraud, whether or not material, that involves management or other employees who have a significant role in the registrant's internal control over financial reporting.

Date: March 15, 2022

By: /s/ Michael Amoroso

Michael Amoroso
President, Chief Executive Officer and Director
(principal executive officer)

Exhibit 31.2

CERTIFICATION PURSUANT TO
RULES 13a-14(a) AND 15d-14(a) UNDER THE SECURITIES EXCHANGE ACT OF 1934,
AS ADOPTED PURSUANT TO SECTION 302 OF THE SARBANES-OXLEY ACT OF 2002

I, John Alexander Kelly, certify that:

1. I have reviewed this Annual Report on Form 10-K for the fiscal year ended December 31, 2021 of Precision BioSciences, Inc.;

2. Based on my knowledge, this report does not contain any untrue statement of a material fact or omit to state a material fact necessary to make the statements made, in light of the circumstances under which such statements were made, not misleading with respect to the period covered by this report;

3. Based on my knowledge, the financial statements, and other financial information included in this report, fairly present in all material respects the financial condition, results of operations and cash flows of the registrant as of, and for, the periods presented in this report;

4. The registrant's other certifying officer(s) and I are responsible for establishing and maintaining disclosure controls and procedures (as defined in Exchange Act Rules 13a-15(e) and 15d-15(e)) and internal control over financial reporting (as defined in Exchange Act Rules 13a-15(f) and 15d-15(f)) for the registrant and have:

   (a) Designed such disclosure controls and procedures, or caused such disclosure controls and procedures to be designed under our supervision, to ensure that material information relating to the registrant, including its consolidated subsidiaries, is made known to us by others within those entities, particularly during the period in which this report is being prepared;

   (b) Designed such internal control over financial reporting, or caused such internal control over financial reporting to be designed under our supervision, to provide reasonable assurance regarding the reliability of financial reporting and the preparation of financial statements for external purposes in accordance with generally accepted accounting principles;

   (c) Evaluated the effectiveness of the registrant's disclosure controls and procedures and presented in this report our conclusions about the effectiveness of the disclosure controls and procedures, as of the end of the period covered by this report based on such evaluation; and

   (d) Disclosed in this report any change in the registrant's internal control over financial reporting that occurred during the registrant's most recent fiscal quarter (the registrant's fourth fiscal quarter in the case of an annual report) that has materially affected, or is reasonably likely to materially affect, the registrant's internal control over financial reporting; and

5. The registrant's other certifying officer(s) and I have disclosed, based on our most recent evaluation of internal control over financial reporting, to the registrant's auditors and the audit committee of the registrant's board of directors (or persons performing the equivalent functions):

   (a) All significant deficiencies and material weaknesses in the design or operation of internal control over financial reporting which are reasonably likely to adversely affect the registrant's ability to record, process, summarize and report financial information; and

   (b) Any fraud, whether or not material, that involves management or other employees who have a significant role in the registrant's internal control over financial reporting.

Date: March 15, 2022

By: /s/ John Alexander Kelly
John Alexander Kelly
Chief Financial Officer
(principal financial officer)

Exhibit 32.1

CERTIFICATION PURSUANT TO
18 U.S.C. SECTION 1350, AS ADOPTED PURSUANT TO
SECTION 906 OF THE SARBANES-OXLEY ACT OF 2002

In connection with the Annual Report of Precision BioSciences, Inc. (the "Company") on Form 10-K for the fiscal year ended December 31, 2021 as filed with the Securities and Exchange Commission on the date hereof (the "Report"), I certify, pursuant to 18 U.S.C. § 1350, as adopted pursuant to § 906 of the Sarbanes-Oxley Act of 2002, that:

(1) The Report fully complies with the requirements of section 13(a) or 15(d) of the Securities Exchange Act of 1934; and

(2) The information contained in the Report fairly presents, in all material respects, the financial condition and results of operations of the Company.

Date: March 15, 2022

By: /s/ Michael Amoroso

Michael Amoroso
President, Chief Executive Officer and Director
(principal executive officer)

Exhibit 32.2

CERTIFICATION PURSUANT TO
18 U.S.C. SECTION 1350, AS ADOPTED PURSUANT TO
SECTION 906 OF THE SARBANES-OXLEY ACT OF 2002

In connection with the Annual Report of Precision BioSciences, Inc. (the "Company") on Form 10-K for the fiscal year ended December 31, 2021 as filed with the Securities and Exchange Commission on the date hereof (the "Report"), I certify, pursuant to 18 U.S.C. § 1350, as adopted pursuant to § 906 of the Sarbanes-Oxley Act of 2002, that:

(1) The Report fully complies with the requirements of section 13(a) or 15(d) of the Securities Exchange Act of 1934; and

(2) The information contained in the Report fairly presents, in all material respects, the financial condition and results of operations of the Company.

Date: March 15, 2022

By: /s/ John Alexander Kelly

John Alexander Kelly
Chief Financial Officer
(principal financial officer)