**UNITED STATES SECURITIES AND EXCHANGE COMMISSION**
**WASHINGTON, D.C. 20549**

# FORM 10-K

☒ **ANNUAL REPORT PURSUANT TO SECTION 13 OR 15(d) OF THE SECURITIES EXCHANGE ACT OF 1934**
**For the fiscal year ended December 31, 2020**

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 001-36289**


## GENOCEA BIOSCIENCES, INC.

(Exact name of registrant as specified in its charter)

| **Delaware** | **51-0596811** |
|---|---|
| (State or other jurisdiction of incorporation or organization) | (I.R.S. Employer Identification No.) |

**100 Acorn Park Drive, Cambridge, MA 02140**
(Address of principal executive offices, including zip code)

**(617) 876-8191**
(Registrant's telephone number, including area code)

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

| Title of each class | Trading symbol | Name of each exchange on which registered |
|---|---|---|
| **Common Stock, $0.001 par value** | **GNCA** | **Nasdaq Capital Market** |

Securities registered pursuant to Section12(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 Section 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 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 a 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. ☐

Indicate by check mark whether the registrant is a shell company (as defined in Rule 12b-2 of the Exchange Act). ☐ Yes ☒ No

The aggregate market value of the registrant's common stock held by non-affiliates on June 30, 2020, the last business day of the registrant's most recently completed second quarter, was: $50,650,089.

The number of shares outstanding of the registrant's common stock as of February 18, 2021 was 53,518,483.

Portions of the Registrant's definitive proxy statement related to its 2021 annual meeting of stockholders to be filed subsequently are incorporated by reference into Part III of this report.

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## FORWARD-LOOKING STATEMENTS

This Annual Report on Form 10-K contains forward-looking statements that involve substantial risks and uncertainties. Forward-looking statements are neither historical facts nor assurances of future performance. Instead, they are based on our current beliefs, expectations and assumptions regarding the future of our business, future plans and strategies, our clinical results and other future conditions. The words "anticipate", "believe", "contemplate", "continue", "could", "estimate", "expect", "forecast", "goal", "intend", "may", "plan", "potential", "predict", "project", "should", "target", "will", "would", or the negative of these terms or other similar expressions are intended to identify forward-looking statements, although not all forward-looking statements contain these identifying words.

The forward-looking statements in this Annual Report on Form 10-K include, among other things, statements about:

- our estimates regarding the timing and amount of funds we require to conduct clinical trials for GEN-011, to continue preclinical studies for our other product candidates and to continue our investments in immuno-oncology;
- our estimates regarding the timing and costs of manufacturing GEN-011 for planned clinical trial;
- our estimates regarding the timing and amount of funds we require to perform monitoring activities to support the GEN-009 clinical trial;
- our estimates regarding expenses, future revenues, capital requirements, the sufficiency of our current and expected cash resources and our need for additional financing;
- our ability to contract with third-party suppliers and manufacturers and their ability to perform adequately;
- the timing of, and our ability to, obtain and maintain regulatory approvals for our product candidates;
- the effect of the novel coronavirus (COVID-19) pandemic on the economy generally and on our business and operations specifically, including our research and development efforts, our clinical trials and our employees, and the potential disruptions in supply chains and to our third party manufacturers, including the availability of materials and equipment;
- the potential benefits of strategic partnership agreements and our ability to enter into strategic partnership arrangements;
- our expectations regarding our ability to obtain and maintain intellectual property protection for our manufacturing methods and product candidates;
- the rate and degree of market acceptance and clinical utility of any approved product candidate;
- our ability to quickly and efficiently identify and develop product candidates; and
- our commercialization, marketing and manufacturing capabilities and strategy.

We may not actually achieve the plans, intentions or expectations disclosed in our forward-looking statements, and investors should not place undue reliance on our forward-looking statements. Actual results or events could differ materially from the plans, intentions and expectations disclosed in the forward-looking statements we make. We have included important factors in the cautionary statements included in this Annual Report on Form 10-K, particularly in the "Risk Factors" section, that we believe could cause actual results or events to differ materially from the forward-looking statements that we make. Our forward-looking statements do not reflect the potential impact of any future acquisitions, mergers, dispositions, joint ventures or investments we may make or collaborations or strategic partnerships we may enter into.

This Annual Report on Form 10-K and the documents that we have filed as exhibits to the Annual Report on Form 10-K should be read completely and with the understanding that our actual future results may be materially different from what we expect. We do not assume any obligation to update any forward-looking statements, whether as a result of new information, future events or otherwise, except as required by law.

## PART I

### Item 1. Business

*Unless the context requires otherwise, references in this Annual Report on Form 10-K to "Genocea", "we", "us" and "our" refer to Genocea Biosciences, Inc.*

**Overview**

We are a biopharmaceutical company dedicated to discovering and developing novel cancer immunotherapies using our proprietary ATLAS™ platform. The ATLAS platform profiles each patient's $CD4^+$ and $CD8^+$ T cell immune responses to every potential target or "antigen" identified by next-generation sequencing of that patient's tumor. ATLAS zeroes in on both antigens that activate anti-tumor T cell responses and inhibitory antigens, Inhibigens™, that drive pro-tumor immune responses. We believe this approach ensures that cancer immunotherapies, such as vaccines and cellular therapies, focus T cell responses on the tumor targets most vulnerable to T cell targeting. Consequently, we believe that ATLAS may enable more immunogenic and efficacious cancer immunotherapies.

Our GEN-011 program is an adoptive T cell therapy using neoantigen-targeted peripheral cells ("NPTs"). The GEN-011 NPTs are specific for ATLAS identified anti-tumor antigens that are used to manufacture peripheral blood-derived, tumor-specific T cell therapy. GEN-011's use of peripheral blood brings potential patient accessibility and cost advantages by eliminating the need for extra surgery or viable tumor. We are initiating clinical sites and accruing patients for a first-in-human GEN-011 clinical trial. Our GEN-009 program is a neoantigen vaccine delivering adjuvanted synthetic long peptides spanning ATLAS-identified anti-tumor neoantigens. After reporting initial clinical responses for GEN-009 delivered in combination with standard-of-care checkpoint inhibitors ("CPIs") in 2020, we continue to monitor patients to further evaluate these initial efficacy signals.

**ATLAS Platform**

Harnessing and directing T cells to kill tumor cells is increasingly viewed as having potential to treat many cancers, including hematologic malignancies and certain solid tumors. Vaccines or cellular therapies employing this approach must target specific differences from normal tissue present in the patient, such as antigens arising from genetic mutations or cancer-causing viruses. However, the discovery of optimal antigens for such immunotherapies has been particularly challenging for two reasons. First, the genetic diversity of human T cell responses means that effective antigens may vary from person to person. Second, the number of candidate antigens can be very large, with up to thousands of candidates per patient in some cancers. An effective antigen selection system must therefore account both for each patient's tumor and for their T cell repertoire.

ATLAS selects antigens through an *ex vivo* assay that unveils $CD4^+$ and $CD8^+$ T cell immune responses each patient has made to nearly any possible tumor-specific antigen, including candidate neoantigens, tumor-associated antigens and tumor-associated viral antigens. In doing so, we believe that ATLAS provides the most comprehensive and accurate system for identifying the right and wrong antigens for cancer immunotherapies. Previously, all candidate antigens were thought either to be targets of effective anti-tumor responses (stimulatory) or irrelevant. However, using ATLAS, we have identified Inhibigens and demonstrated, in preclinical studies, that such antigens can promote rapid tumor growth, reduce or eliminate the protection of an otherwise effective vaccine, and dampen or reverse the effects of checkpoint inhibitors. We have also demonstrated that classical antigen selection methodologies often mischaracterize Inhibigens as stimulatory. We therefore believe that both by identifying the optimal neoantigens and by excluding Inhibigens, ATLAS enables differentiated immune responses and clinical efficacy.

We believe ATLAS could have beneficial uses beyond cancer. We have previously demonstrated its effectiveness in infectious disease, but we believe it also could provide benefits in autoimmune disease and other diseases. While we believe Inhibigens should be avoided in cancer immunotherapies, they could prove to be beneficial in other therapies. ATLAS could be a key tool in identifying meaningful therapies across a number of diseases.

The ATLAS intellectual property portfolio comprises seven patent families and three additional pending patent families. The first two families are comprised of issued United States ("U.S.") patents, with patent terms ranging from 2027 to 2031, as well as granted foreign patents. The second family also includes pending U.S. and foreign applications. The third family is directed to ATLAS-based methods for selecting or deselecting Inhibigens and stimulatory antigens, cancer diagnosis, prognosis and patient selection, as well as related compositions. This patent family is comprised of an issued U.S. patent, pending applications in eleven foreign jurisdictions, and a pending U.S. application. Patents issuing from these applications are expected to have a patent term until at least 2038. The four further families and three potential additional families currently comprise Patent Cooperation Treaty ("PCT") applications or U.S. provisional applications, and are directed to various methods using ATLAS-identified antigens, to dose regimens for GEN-009, and to our cell-based therapy GEN-011.

**Our Programs**

***GEN-009***

GEN-009 is a neoantigen vaccine candidate delivering adjuvanted synthetic long peptides spanning ATLAS-identified anti-tumor neoantigens. We are conducting a Phase 1/2a clinical trial for GEN-009 across a range of solid tumor types. Part A of the trial is assessing the monotherapy GEN-009 for safety, immunogenicity and ability to prevent disease relapse in certain cancer patients with no detectable tumor at the time of vaccination but with a risk of relapse. Part B of the trial is assessing the safety, immunogenicity and preliminary antitumor activity of GEN-009 in combination with CPI therapy in patients with advanced or metastatic tumors.

In Part A of the trial, through January 27, 2021, we have observed the following in the eight dosed patients:

- 100% of patients had measurable $CD4^+$ and/or $CD8^+$ T cell responses to their GEN-009 vaccine;
- Responses were detected against 99% of the administered vaccine neoantigens (N=88 administered antigens), a response rate in excess of that which has been reported previously by others in response to candidate neoantigen vaccines;
- GEN-009 elicited $CD8^+$ T cell responses *ex vivo*, which is a measure of T cell effector function, to 41% of vaccine neoantigens and $CD4^+$ T cell responses to 51% of neoantigens;
- GEN-009 elicited broad immune responses using an *in vitro* stimulation assay, which is a measure of central memory responses, with 87% of neoantigens eliciting a $CD4^+$ response and 58% of neoantigens eliciting a $CD8^+$ response;
- GEN-009 was well tolerated, with no dose-limiting toxicities observed; and
- Only one of the eight vaccinated patients has developed a recurrence of their tumor.

In Part B of the trial, we continue to evaluate immune responses and efficacy in two cohorts of patients, those who are checkpoint-sensitive and those who are checkpoint-resistant.

- In the checkpoint-sensitive cohort, we believe we have shown compelling signals of response.
  - Of the nine checkpoint-sensitive patients, three have independent RECIST™ criteria responses that appear to be attributable to GEN-009.
  - Of those three patients, one patient achieved a complete response and two patients achieved a partial response after vaccination.
- In the checkpoint resistant cohort, we believe that GEN-009 has shown early evidence of stabilization of disease.
  - This group of seven patients initially started their CPI therapy but quickly progressed and transitioned to standard of care therapy which generally consists of radiation and/or chemotherapy. After completing the standard-of-care therapy, these patients received GEN-009 vaccination.
  - Of the seven patients, five appear to have achieved initial disease stabilization.

We believe the GEN-009 data confirm the potential antigen selection advantages of ATLAS and suggest a differentiating advantage for GEN-011.

***GEN-011***

We believe that GEN-011 represents a new category of solid tumor adoptive T cell therapy, neoantigen-targeted peripheral T cells ("NPTs"). The first neoantigen-targeted T cell therapy to demonstrate clinical efficacy in patients with solid tumors is tumor-infiltrating lymphocyte ("TIL") therapy. TILs consist of a subset of lymphocytes that have invaded a tumor but, importantly, are not all necessarily specific for tumor antigens. TIL therapy requires a fresh patient tumor sample from which to extract TILs. These TILs are then non-specifically expanded in the presence of high dose interleukin-2 ("IL-2") *ex vivo* and infused into that same patient, who has undergone lymphodepletion preconditioning, followed by high dose IL-2 treatment. In certain patients with solid tumors resistant to CPI therapy, TIL therapy has resulted in some evidence of durable clinical responses. TIL therapy has some drawbacks: it is infeasible to get sufficient tumor or TILs from some patients, the need for fresh tumor adds time and cost to the therapy, and the therapy – particularly because of the high dose IL-2 – may cause serious adverse events requiring hospitalization.

GEN-011 differs from TIL therapy in two critical ways. First, Genocea uses ATLAS to design the product to be highly specific for the neoantigens of anti-tumor T cell responses. Second, Genocea relies on T cells extracted from a simple peripheral blood draw. We believe these differences may result in GEN-011, if approved, offering efficacy, patient accessibility and cost advantages over other neoantigen-targeting solid tumor T cell therapies.

The potential efficacy advantages derive from the following product features:

- Targeting up to 30 tumor-specific antigens to limit tumor escape, with minimal tumor non-specific bystander T cells;
- Avoiding T cells specific for Inhibigens that may be detrimental to clinical response;
- Including both $CD4^+$ and $CD8^+$ tumor antigen-specific T cells; and
- Using peripheral blood-derived T cells, which are believed to have potential for superior activity and persistence when compared to TILs.

The potential patient accessibility and cost advantages derive from the fact that:

- No extra surgery or viable tumor is required as starter material;
- GEN-011 can treat any patient, while some adoptive T cell therapies engineer T cells for applicability to certain human leukocyte antigen types, often limiting their clinical utility to certain subsets of western Caucasians; and
- The GEN-011 cell expansion process is comparatively straightforward, with no T cell receptor ("TCR") vector design or transduction required.

Across more than 16 development and engineering runs in blood derived from cancer patients and healthy donors, we have demonstrated that GEN-011 NPTs:

- Are 99% T cells made up of both $CD4^+$ and $CD8^+$ T cells with the desired T cell phenotype (>98% central and effector memory, on average);
- Highly neoantigen-specific (96% neoantigen-specific, with activity against 89% of target neoantigens on average);
- Powerfully cytolytic against their targets with no off-target cytotoxicity *in vitro*;
- Polyfunctional, secreting effector, stimulatory and chemoattractive mediators; and
- Highly active and potent.

We are conducting a first-in-human clinical trial (the “TITAN trial”), treating patients with immune responsive tumors that have not achieved an adequate response after CPI therapy with GEN-011 as monotherapy. Our target indications include melanoma, non-small cell lung cancer, small cell lung cancer, squamous cell carcinoma of the head and neck, urothelial carcinoma, renal cell carcinoma, cutaneous squamous cell carcinoma, and anal squamous cell carcinoma.

The TITAN trial will contain two patient cohorts:

- Cohort A patients will receive GEN-011 in a repeated low dose regimen with no lymphodepletion and a low dose of IL-2 after each GEN-011 dose;
- Cohort B patients will receive GEN-011 as a single high dose with both lymphodepletion and high dose IL-2.

The TITAN trial’s objectives are safety, clinical activity including overall response rate and duration of response and GEN-011’s proliferation and persistence as well as tumor T cell penetration. We expect to have initial data from a small subset of patients in the fourth quarter of 2021 or the first quarter of 2022.

***Other research activities***

In addition to our two clinical programs, we are conducting research in several areas:

- Exploring the potential for novel antigens of protective T cell responses to SARS-CoV-2 ("COVID-19") to provide effectiveness against multiple virus strains, partly in collaboration with the University of Massachusetts Medical School;
- Identifying TCRs to ATLAS-identified shared neoantigens, in collaboration with the University of Minnesota;
- Exploring cancers of viral origin such as Epstein-Barr virus and human papilloma virus;
- Identifying shared antigen immunotherapies encompassing shared neoantigens and non-mutated tumor-associated antigens;
- Exploring Inhibigen biology; and
- Further strengthening and streamlining ATLAS.

Since these other research activities are early stage, we cannot provide specific timelines for if, or when, these activities may result in new clinical candidates.

**Competition**

The biotechnology and pharmaceutical industries are characterized by intense and rapidly changing competition to develop new technologies and proprietary products. Although we believe that our proprietary patent portfolio and T cell vaccine and cellular therapy expertise provide us with competitive advantages, we face potential competition from many different sources, including larger and better-funded pharmaceutical companies. Not only must we compete with other immuno-oncology companies but any products that we may commercialize will have to compete with existing therapies and new therapies that may become available in the future.

There are several companies attempting to develop cellular therapies targeted towards neoantigens, either through transferring T cells that have been transduced with TCRs that recognize tumor antigens, or TILs, or T cells from the peripheral blood that have been expanded on multiple tumor-specific antigens. These include Achilles Therapeutics Ltd., BioNTech SE, F. Hoffmann-La Roche AG, Gilead Sciences, Inc., Iovance Biotherapeutics Inc., PACT Pharma Inc., and Ziopharm Oncology Inc. We believe that Genocea's ATLAS true neoantigen selection will lead to better targeted and more effective cell therapy. However, there can be no assurance that one or more of these companies, or other companies, will not achieve similar or superior clinical results in the future as compared to GEN-011, or that our future clinical trials will be successful.

Similarly, there are other companies attempting to develop new neoantigen cancer vaccines, including BioNTech SE, CureVac AG, Genentech, Inc., Gritstone Oncology Inc., Merck & Co., Inc., Moderna Inc., Nouscom AG, and Vaccibody AS. We believe that GEN-009 has advantages against each of these product candidates based on the potential power of the ATLAS platform to comprehensively identify for each cancer patient the neoantigens to which such patient has a pre-existing immune response. We believe that selecting neoantigens for personal cancer vaccines using ATLAS will lead to more effective vaccines. However, there can be no assurance that one or more of these companies, or other companies, will not achieve similar or superior clinical results in the future as compared to GEN-009, or that our future clinical trials will be successful.

Many of our competitors, either alone or with their strategic partners, have substantially greater financial, technical and human resources than we do and greater experience in the discovery and development of product candidates, obtaining U.S. Food and Drug Administration ("FDA"), and other regulatory approvals of vaccines and the commercialization of those vaccines or cellular therapies. Accordingly, our competitors may be more successful than us in obtaining approval for vaccines and cellular therapies and achieving widespread market acceptance. Our competitors' vaccines or cellular therapies may be more effective, or more effectively marketed and sold, than any we may commercialize and may render our products obsolete or non-competitive.

Mergers and acquisitions in the biotechnology and pharmaceutical industries may result in even more resources being concentrated among a smaller number of our competitors. 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. Smaller or early-stage companies may also prove to be significant competitors, particularly through collaborative arrangements with large and established companies.

We anticipate that we will face intense and increasing competition as new drugs enter the market and advanced technologies become available. We expect any vaccines or cellular therapies that we develop and commercialize to compete based on, among other things, efficacy, safety, convenience of administration and delivery, price, the level of generic competition, and the availability of reimbursement from government and other third-party payors.

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 our products, which could result in our competitors establishing a strong market position before we are able to enter the market. In addition, our ability to compete may be affected in many cases by insurers or other third-party payors seeking to encourage the use of generic products.

**Intellectual Property**

We strive to protect and enhance the proprietary technology, inventions, and improvements that are commercially important to our business, including seeking, maintaining, and defending patent rights, whether developed internally or licensed from third parties. We also rely on trade secrets relating to our proprietary technology platform and on know-how, continuing technological innovation and in-licensing opportunities to develop, strengthen and maintain our proprietary position in the vaccine and cellular therapy fields. We additionally rely on regulatory protection afforded through data exclusivity, market exclusivity, and patent term extensions where available. Still further, we utilize trademark protection for our company name, and expect to do so for products and/or services as they are marketed.

Our commercial success may depend in part on our ability to obtain and maintain patent and other proprietary protection for commercially important technology, inventions and know-how related to our business; defend and enforce our patents; preserve the confidentiality of our trade secrets; and operate without infringing the valid enforceable patents and proprietary rights of third parties. Our ability to stop third parties from making, using, selling, offering to sell or importing our products may depend on the extent to which we have rights under valid and enforceable patents or trade secrets that cover these activities. With respect to both licensed and company-owned intellectual property, we cannot be sure that patents will be granted with respect to any of our pending patent applications or with respect to any patent applications filed by us in the future, nor can we be sure that any of our existing patents or any patents that may be granted to us in the future will be commercially useful in protecting our commercial products and methods of manufacturing the same.

We have developed or in-licensed numerous patents and patent applications and possess substantial know-how and trade secrets relating to the development and commercialization of vaccine and cellular therapy products. The term of individual patents depends upon the legal term of the patents in the countries in which they are obtained. In most countries in which we file, the patent term is 20 years from the date of filing the non-provisional application. In the U.S., a patent's term may be lengthened by patent term adjustment ("Patent Term Adjustment"), which compensates a patentee for administrative delays by the U.S. Patent and Trademark Office ("U.S. PTO") in granting a patent, or may be shortened, if a patent is terminally disclaimed over an earlier-filed patent.

The term of a patent that covers an FDA-approved drug may also be eligible for patent term extension, which permits patent term restoration of a U.S. patent as compensation for the patent term lost during the FDA regulatory review process. The Hatch-Waxman Act permits a patent term extension of up to five years beyond the expiration of the patent. The length of the patent term extension is related to the length of time the drug is under regulatory review. A patent term extension cannot extend the remaining term of a patent beyond a total of 14 years from the date of product approval and only one patent applicable to an approved drug may be extended. Moreover, a patent can only be extended once, and thus, if a single patent is applicable to multiple products, it can only be extended based on one product. Similar provisions are available in Europe and other foreign jurisdictions to extend the term of a patent that covers an approved drug. When possible, depending upon the length of clinical trials and other factors involved in the filing of a biologics license application ("BLA"), we expect to apply for patent term extensions for patents covering our product candidates and their methods of use.

As of the date of this Annual Report on Form 10-K, our patent portfolio includes the following:

***ATLAS***

Our discovery platform patent portfolio includes three patent families, currently comprising eight issued U.S. patents. We hold an exclusive license from President and Fellows of Harvard College ("Harvard") to the first patent family, which covers methods related to the ATLAS discovery platform, including discovery of antigens expressed in neoplastic cells. This first patent family includes U.S. Patents 9,051,564, 9,920,314 and 10,662,423, and patents granted in Europe, Canada, and Australia. U.S. Patent 10,662,423 and the granted foreign patents in this family are expected to expire in February 2027. U.S. Patents 9,920,314 and 9,051,564 include Patent Term Adjustments and extend until June 2028 and December 2031, respectively. We wholly own a second patent family, which is specifically directed to the ATLAS platform as utilized by us, including for discovery of cancer or tumor-related antigens. This second patent family includes U.S. Patents 8,313,894, 9,045,791, 9,873,870 and 10,570,387, a pending U.S. patent application, issued patents in Europe, Canada, and Australia, and a pending application in Europe. The granted foreign patents in this family have a patent term until July 2029. U.S. Patents 8,313,894 and 9,045,791 have terms that include Patent Term Adjustments and extend until August 2030 and August 2029, respectively. U.S. Patents 9,873,870 and 10,570,387 have terms that extend until July 2029. We wholly own the third patent family, which is directed to methods for selecting or deselecting Inhibigens and stimulatory antigens, cancer diagnosis, prognosis, and patient selection, as well as related compositions. This third family currently comprises U.S. Patent 10,859,566 with a patent term until March 2038, pending applications in eleven foreign jurisdictions, and a pending U.S. application. We wholly own three further patent families, each comprising a pending PCT application, claiming first priority to provisional applications filed in late 2018, and two potential patent families, each comprising provisional applications filed in mid-2020. These PCT and U.S. provisional applications are directed to further methods using ATLAS-identified antigens, redirecting immune responses and re-educating T cells.

An additional patent family comprising a PCT application, claiming first priority to a U.S. provisional application filed in mid-2019, is directed to dose regimens for GEN-009, and a potential patent family comprising U.S. provisional applications, having an earliest filing date of late 2020, is directed to our cell-based therapy GEN-011.

**License Agreements**

***Harvard University***

We have an exclusive license agreement with Harvard University ("Harvard"), granting us an exclusive, worldwide, royalty-bearing, sublicensable license to three patent families, to develop, make, have made, use, market, offer for sale, sell, have sold and import licensed products and to perform licensed services related to the ATLAS discovery platform. We are also obligated to pay Harvard milestone payments up to $1.6 million in the aggregate upon the achievement of certain development and regulatory milestones. As of December 31, 2020, we have paid $0.3 million in aggregate milestone payments. We are obligated under this license agreement to use commercially reasonable efforts to develop, market and sell licensed products in compliance with an agreed upon development plan. In addition, we are obligated to achieve specified development milestones and in the event we are unable to meet our development milestones for any type of product or service, absent any reasonable proposed extension or amendment thereof, Harvard has the right, depending on the type of product or service, to terminate this agreement with respect to such products or to convert the license to a non-exclusive, non-sublicensable license with respect to such products and services.

Upon commercialization of our products covered by the licensed patent rights or discovered using the licensed methods, we are obligated to pay Harvard royalties on the net sales of such products and services sold by us, our affiliates, and our sublicensees. This royalty varies depending on the type of product or service but is in the low single digits. The sales-based royalty due by our sublicensees is the greater of the applicable royalty rate or a percentage in the high single digits or the low double digits of the royalties we receive from such sublicensee, depending on the type of product. Based on the type of commercialized product or service, royalties are payable until the expiration of the last-to-expire valid claim under the licensed patent rights or for a period of 10 years from first commercial sale of such product or service. The royalties payable to Harvard are subject to reduction, capped at a specified percentage, for any third-party payments required to be made. In addition to the royalty payments, if we receive any additional revenue (cash or non-cash) under any sublicense, we must pay Harvard a percentage of such revenue, excluding certain categories of payments, varying from the low single digits to up to the low double digits depending on the scope of the license that includes the sublicense.

This license agreement with Harvard will expire on a product-by-product or service-by-service and country-by-country basis until the expiration of the last-to-expire valid claim under the licensed patent rights. We may terminate the agreement at any time by giving Harvard advance written notice. Harvard may also terminate the agreement in the event of a material breach by us that remains uncured; in the event of our insolvency, bankruptcy, or similar circumstances; or if we challenge the validity of any patents licensed to us.

***Oncovir License and Supply Agreement***

In January 2018, we entered into a License and Supply Agreement with Oncovir, Inc. ("Oncovir"). The agreement provides the terms and conditions under which Oncovir will manufacture and supply an immunomodulator and vaccine adjuvant, Hiltonol® (poly-ICLC) ("Hiltonol"), to us for use in connection with the research, development, use, sale, manufacture, commercialization and marketing of products combining Hiltonol with our technology (the "Combination Product"). Hiltonol is the adjuvant component of GEN-009, which will consist of synthetic long peptides or neoantigens identified using our proprietary ATLAS platform, formulated with Hiltonol.

Oncovir granted us a non-exclusive, assignable, royalty-bearing worldwide license, with the right to grant sublicenses through one tier, to certain of Oncovir's intellectual property in connection with the research, development, or commercialization of Combination Products, including the use of Hiltonol, but not the use of Hiltonol for manufacturing or the use or sale of Hiltonol alone. The license will become perpetual, fully paid-up, and royalty-free on the later of January 25, 2028 or the date on which the last valid claim of any patent licensed to us under the agreement expires.

Under this agreement, we are obligated to pay Oncovir low to mid six figure milestone payments upon the achievement of certain clinical trial milestones for each Combination Product and the first marketing approval for each Combination Product in certain territories as well as tiered royalties in the low-single digits on a product-by-product basis based on the net sales of Combination Products.

We may terminate the agreement upon a decision to discontinue the development of the Combination Product or upon a determination by us or an applicable regulatory authority that Hiltonol or a Combination Product is not clinically safe or effective. The agreement may also be terminated by either party due to a material uncured breach by the other party, or due to the other party's bankruptcy, insolvency, or dissolution.

**Trade Secrets**

We may rely, in some circumstances, on trade secrets to protect our technology. However, trade secrets can be difficult to protect. We seek to protect our proprietary technology and processes, in part, by entering into confidentiality agreements with our employees, consultants, scientific advisors and contractors. 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. While we have confidence in these individuals, organizations, and systems, agreements or security measures may be breached, and we may not have adequate remedies for any breach. In addition, our trade secrets may otherwise become known or be independently discovered by competitors. To the extent that our consultants, contractors, or collaborators use intellectual property owned by others in their work for us, disputes may arise as to the rights in related or resulting know-how and inventions.

**Government Regulation**

We primarily operate in the United States ("U.S.") and conduct our clinical trials in the U.S. and Canada. If we expand outside of these geographic areas other governmental regulations may become applicable. Biological products such as vaccines and adoptive cell therapies are subject to regulation under the Federal Food, Drug, and Cosmetic Act ("FD&C Act") and the Public Health Service Act ("PHS Act"), and other federal, state, local and foreign statutes and regulations. Both the FD&C and PHS Acts and their corresponding regulations govern, among other things, the testing, manufacturing, safety, efficacy, labeling, packaging, storage, record keeping, distribution, reporting, advertising and other promotional practices involving biological products. Clinical testing of biological products is subject to FDA review before initiation. In addition, FDA approval must be obtained before marketing of biological products. The process of obtaining regulatory review and approval and the subsequent compliance with appropriate federal, state, local and foreign statutes and regulations require the expenditure of substantial time and financial resources and we may not be able to obtain the required regulatory approvals.

***U.S Biological Products Development Process***

The process required by the FDA before a biological product may be marketed in the U.S. generally involves the following process:

- completion of nonclinical laboratory tests and animal studies according to good laboratory practices ("GLP") and applicable requirements for the humane use of laboratory animals or other applicable regulations;
- submission to the FDA of an application for an IND which must become effective before human clinical trials may begin;
- performance of adequate and well-controlled human clinical trials according to the FDA's regulations commonly referred to as good clinical practices ("GCP") and any additional requirements for the protection of human research subjects and their health information, to establish the safety and efficacy of the proposed biological product for its intended use, including approval by an independent Institutional Review Board ("IRB"), representing each clinical site before each clinical trial may be initiated;
- submission to the FDA of a BLA for marketing approval that includes substantive evidence of safety, purity, and potency from results of nonclinical testing and clinical trials;
- satisfactory completion of an FDA inspection of the manufacturing facility or facilities where the biological product is produced to assess compliance with good manufacturing practices ("GMPs") to assure that the facilities, methods and controls are adequate to preserve the biological product's identity, strength, quality and purity and, if applicable, the FDA's current good tissue practices ("GTP") for the use of human cellular and tissue products;
- potential FDA audit of the nonclinical and clinical trial sites that generated the data in support of the BLA; and
- FDA review and approval, or licensure, of the BLA.

Before testing any biological product candidate in humans, the product candidate enters the preclinical study stage. Preclinical studies, also referred to as nonclinical studies, include laboratory evaluations of product chemistry, toxicity and formulation, as well as animal studies to assess the potential safety and activity of the product candidate. The conduct of the preclinical studies must comply with federal regulations and requirements including GLPs.

The clinical trial sponsor must submit the results of the preclinical tests, together with manufacturing information, analytical data, any available clinical data or literature and a proposed clinical protocol, to the FDA as part of the IND. Some preclinical studies may continue even after the IND is submitted. The IND automatically becomes effective 30 days after receipt by the FDA, unless the FDA places the clinical trial on a clinical hold within that 30-day time period. In such a case, the IND sponsor and the FDA must resolve any outstanding concerns before the clinical trial can begin. The FDA also may impose clinical holds on a biological product candidate at any time before or during clinical trials due to safety concerns or non-compliance. If the FDA imposes a clinical hold, studies may not recommence without FDA authorization and then only under terms authorized by the FDA. Accordingly, we cannot be sure that submission of an IND will result in the FDA allowing clinical trials to begin, or that, once begun, issues will not arise that suspend or terminate such studies.

Clinical trials involve the administration of the biological product candidate to patients under the supervision of qualified investigators, generally physicians not employed by or under the trial sponsor's control. Clinical trials are conducted under protocols detailing, among other things, the objectives of the clinical trial, dosing procedures, subject selection and exclusion criteria, and the parameters to be used to monitor subject safety, including stopping rules that assure a clinical trial will be stopped if certain adverse events ("AEs") should occur. Each protocol and any amendments to the protocol must be submitted to the FDA as part of the IND. Clinical trials must be conducted and monitored in accordance with the FDA's regulations comprising the GCP requirements, including the requirement that all research subjects provide informed consent. Further, each clinical trial must be reviewed and approved by an IRB, at or servicing each institution at which the clinical trial will be conducted. An IRB is charged with protecting the welfare and rights of trial participants and considers such items as whether the risks to individuals participating in the clinical studies are minimized and are reasonable in relation to anticipated benefits. The IRB also approves the form and content of the informed consent that must be signed by each clinical trial subject or his or her legal representative and must monitor the clinical trial until completed.

Clinical trials are typically conducted in three sequential phases that may overlap or be combined:

- Phase 1. The biological product is initially introduced into healthy human subjects and tested for safety, dosage tolerance, absorption, metabolism, distribution and excretion. In the case of some products for severe or life-threatening diseases, especially when the product may be too inherently toxic to ethically administer to healthy volunteers, the initial human testing is often conducted in patients.
- Phase 2. The biological product is evaluated in a limited patient population to identify possible AEs and safety risks, to preliminarily evaluate the efficacy of the product for specific targeted diseases and to determine dosage tolerance, optimal dosage and dosing schedule.
- Phase 3. Clinical studies are undertaken to further evaluate safety, purity, and potential of biological product in an expanded patient population at geographically dispersed clinical trial sites. These clinical studies are intended to establish the overall risk/benefit ratio of the product and provide an adequate basis for product approval and product labeling.

Post-approval clinical studies, sometimes referred to as Phase 4 clinical studies, may be conducted after initial marketing approval. These clinical studies are used to gain additional experience from the treatment of patients in the intended therapeutic indication, particularly for long-term safety follow-up.

During all phases of clinical development, regulatory agencies require extensive monitoring and auditing of all clinical activities, clinical data and clinical trial investigators. Annual progress reports detailing the results of the clinical studies must be submitted to the FDA. Written IND safety reports must be promptly submitted to the FDA and the investigators for serious and unexpected AEs, any findings from other studies, tests in laboratory animals or in vitro testing that suggest a significant risk for human subjects, or any clinically important increase in the rate of a serious suspected adverse reaction over that listed in the protocol or investigator brochure. The sponsor must submit an IND safety report within 15 calendar days after the sponsor determines that the information qualifies for reporting. The sponsor also must notify the FDA of any unexpected fatal or life-threatening suspected adverse reaction within seven calendar days after the sponsor's initial receipt of the information. Phase 1, Phase 2 and Phase 3 clinical studies may not be completed successfully within any specified period, if at all. The FDA or the sponsor or its data safety monitoring board may suspend or terminate a clinical trial at any time on various grounds, including a finding that the research subjects or patients are being exposed to an unacceptable health risk. Similarly, an IRB can suspend or terminate approval of a clinical trial at its institution if the clinical trial is not being conducted in accordance with the IRB's requirements or if the biological product has been associated with unexpected serious harm to patients. Sponsors of all controlled clinical trials, except for Phase 1 trials, are required to submit certain clinical trial information for inclusion in the public clinical trial registry and results data bank maintained by the National Institutes of Health.

Concurrent with clinical studies, companies must also develop additional information about the physical characteristics of the biological product as well as finalize a process for manufacturing the product in commercial quantities in accordance with GMP requirements. To help reduce the risk of the introduction of adventitious agents with use of biological products, the PHS Act emphasizes the importance of manufacturing control for products whose attributes cannot be precisely defined. The manufacturing process must be capable of consistently producing quality batches of the product candidate and, among other things, the sponsor must develop methods for testing the identity, strength, quality, potency and purity of the final biological product. Additionally, appropriate packaging must be selected and tested, and stability studies must be conducted to demonstrate that the biological product candidate does not undergo unacceptable deterioration over its shelf life.

***U.S. Review and Approval Processes***

After the completion of clinical trials of a biological product, FDA approval of a BLA must be obtained before commercial marketing of the biological product. The BLA must include results of product development, laboratory and animal studies, human studies, information on the manufacture and composition of the product, proposed labeling and other relevant information. In addition, under the Pediatric Research Equity Act, a BLA or supplement to a BLA must contain data to assess the safety and effectiveness of the biological product for the claimed indications in all relevant pediatric subpopulations and to support dosing and administration for each pediatric subpopulation for which the product is safe and effective. The FDA may grant deferrals for submission of data or full or partial waivers. The testing and approval processes require substantial time and effort and there can be no assurance that the FDA will accept the BLA for filing and, even if filed, that any approval will be granted on a timely basis, if at all, and for what indications will be approved, if any.

Under the Prescription Drug User Fee Act ("PDUFA"), as re-authorized for an additional five years in 2017, each BLA must be accompanied by a significant user fee. PDUFA also imposes annual program fees based on each approved biologic. Fee waivers or reductions are available in certain circumstances, including a waiver of the application fee for the first application filed by a small business.

Within 60 days following submission of the application, the FDA reviews the BLA to determine if it is substantially complete before the agency accepts it for filing. The FDA may refuse to file any BLA that it deems incomplete or not properly reviewable at the time of submission and may request additional information. In this event, the BLA must be resubmitted with the additional information. The resubmitted application also is subject to review before the FDA accepts it for filing. Once the submission is accepted for filing, the FDA begins an in-depth substantive review of the BLA. The FDA reviews the BLA to determine, among other things, whether the proposed product is safe and potent, or effective, for its intended use, and has an acceptable purity profile, and whether the product is being manufactured in accordance with GMP regulations to assure and preserve the product's identity, safety, strength, quality, potency and purity. The FDA may refer applications for novel biological products or biological products that present difficult questions of safety or efficacy to an advisory committee, typically a panel that includes clinicians and other experts, for review, evaluation and a recommendation as to whether the application should be approved and under what conditions. The FDA is not bound by the recommendations of an advisory committee, but it considers such recommendations carefully when making decisions. During the biological product approval process, the FDA also will determine whether a Risk Evaluation and Mitigation Strategy ("REMS"), is necessary to assure the safe use of the biological product. If the FDA concludes a REMS is needed, the sponsor of the BLA must submit a proposed REMS; the FDA will not approve the BLA without a REMS, if required.

Before approving a BLA, the FDA will inspect the facilities at which the product is manufactured. The FDA will not approve the product unless it determines that the manufacturing processes and facilities are in compliance with GMP requirements 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 to assure that the clinical trials were conducted in compliance with IND study requirements and GCP requirements. To assure GMP, GTP and GCP compliance, an applicant must incur significant expenditure of time, money and effort in the areas of training, record keeping, production, and quality control.

Notwithstanding the submission of relevant data and information, the FDA may ultimately decide that the BLA does not satisfy its regulatory criteria for approval and deny approval. Data obtained from clinical trials are not always conclusive and the FDA may interpret data differently than we interpret the same data. If the agency decides not to approve the BLA in its present form, the FDA will issue a complete response letter that usually describes all of the specific deficiencies in the BLA identified by the FDA. The deficiencies identified may be minor, for example, requiring labeling changes, or major, for example, requiring additional clinical trials. Additionally, the complete response letter may include recommended actions that the applicant might take to place the application in a condition for approval. If a complete response letter is issued, the applicant may either resubmit the BLA, addressing all of the deficiencies identified in the letter, or withdraw the application.

If a product receives regulatory approval, the approval may be significantly limited to specific diseases and dosages or the indications for use may otherwise be limited, which could restrict the commercial value of the product. Further, the FDA may require that certain contraindications, warnings or precautions be included in the product labeling. The FDA may impose restrictions and conditions on product distribution, prescribing, or dispensing in the form of a REMS, or otherwise limit the scope of any approval. In addition, the FDA may require post marketing clinical trials, sometimes referred to as Phase 4 clinical trials, designed to further assess a biological product's safety and effectiveness, and testing and surveillance programs to monitor the safety of approved products that have been commercialized.

***U.S. Fraud and Abuse, Transparency and Privacy Laws***

In the U.S., our business activities are subject to numerous other federal, state and local laws designed to, for example, prevent fraud and abuse; promote transparency in interactions with others in the healthcare industry; protect the privacy of individual information; ensure integrity of research or protect human subjects involved in research. These laws are enforced by various federal and state enforcement authorities, including but not limited to, the U.S. Department of Justice, and individual U.S. Attorney offices within the Department of Justice, the U.S. Department of Health and Human Services ("HHS"), HHS' various divisions, including but not limited to, the Centers for Medicare & Medicaid Services ("CMS"), the Office of Inspector General, the Office for Human Research Protections, and the Office of Research Integrity, and other state and local government agencies.

Although we currently have no products approved for commercial sale, we may be subject to various federal and state laws pertaining to health care "fraud and abuse," including anti-kickback laws and false claims laws, for activities related to future sales of any of our product candidates that may in the future receive regulatory and marketing approval. Anti-kickback laws generally prohibit a pharmaceutical manufacturer from soliciting, offering, receiving, or paying any remuneration to generate business, including the purchase, prescription or use of a particular drug. False claims laws generally prohibit anyone from knowingly and willingly presenting, or causing to be presented, any claims for payment for reimbursed drugs or services to third party payors (including Medicare and Medicaid) that are false or fraudulent. Although the specific provisions of these laws vary, their scope is generally broad and there may not be regulations, guidance or court decisions that apply the laws to particular industry practices. There is therefore a possibility that our practices might be challenged under such laws.

Laws and regulations have been enacted by the federal government and various states to regulate the sales and marketing practices of pharmaceutical manufacturers with marketed products. The laws and regulations generally limit financial interactions between manufacturers and health care providers; require manufacturers to adopt certain compliance standards and/or require disclosure to the government and public of such interactions. Many of these laws and regulations contain ambiguous requirements or require administrative guidance for implementation. Given the lack of clarity in laws and their implementation, any future activities (if we obtain approval and/or reimbursement from federal healthcare programs for our product candidates) could be subject to challenge.

We may be subject to privacy and security laws in the various jurisdictions in which we operate, obtain or store personally identifiable information. Numerous U.S. federal and state laws govern the collection, use, disclosure and storage of personal information. Various foreign countries also have, or are developing, laws governing the collection, use, disclosure and storage of personal information. Globally, there has been an increasing focus on privacy and data protection issues that may affect our business. See *"Risk Factors - Risks Related to Our Business and Industry"*.

If our operations are found to be in violation of any of the health regulatory laws described above, or any other laws that apply to us, we may be subject to penalties, including, without limitation, civil, criminal, and administrative penalties, damages, monetary fines, disgorgement, possible exclusion from participation in Medicare, Medicaid and other federal health care programs, contractual damages, reputational harm, diminished profits and future earnings, and curtailment or restructuring of our operations.

***Reimbursement***

The commercial success of any approved products will depend, in part, on the availability of coverage and adequate reimbursement for such products from third-party payors, such as government health care programs, private health insurers, and managed care organizations. These third-party payors are increasingly challenging the prices charged for medical products and services and imposing controls to manage costs. The containment of health care costs has become a priority of federal and state governments and the prices of drugs have been a focus in this effort. Governments have shown significant interest in implementing cost-containment programs, including price controls, restrictions on reimbursement and requirements for substitution of generic products. Adoption of price controls and cost-containment measures, and adoption of more restrictive policies in jurisdictions with existing controls and measures, could further limit our net revenue and results. Third-party payors may limit coverage to specific products on an approved list or formulary, which might not include all of the FDA-approved products for a particular indication. In addition, there is significant uncertainty regarding the reimbursement status of newly approved health care products. Third-party payors are increasingly examining the medical necessity and cost-effectiveness of medical products and services, in addition to their safety and efficacy. We may need to conduct expensive pharmacoeconomic studies in order to demonstrate the cost-effectiveness of our products. If third-party payors do not consider our products to be cost-effective compared to other therapies, the payors may not cover our products after approval as a benefit under their plans or, if they do, the level of payment may not be sufficient to allow us to sell our products on a profitable basis. Further, we may have to offer discounts or rebates to purchasers before purchasers will agree to purchase our products or to third-party payors in order to obtain and maintain acceptable reimbursement levels and access for patients at copay levels that are reasonable and customary. We may also have to enter into value-based arrangements with such entities in which the amount ultimately paid for our products depends on the performance of our products, as measured by metrics such as patient outcomes or cost savings. Utilization of any of our approved products may be affected by whether third-party payors provide incentives to health care providers to use our products as part of a "pay for performance" program intended to improve the quality of care provided to patients.

Within the U.S., if we obtain appropriate approval in the future to market any of our current product candidates, we may seek coverage for those products under Medicaid, Medicare, and the 340B drug pricing programs. These programs are administered by various federal and state agencies and provide prescription drug benefits to individuals who are age 65 and over, low income, or disabled or allow healthcare providers that serve vulnerable populations to purchase prescription drugs at discounted prices. In the future, we may also seek to sell any approved product candidates to government purchasers. In order to obtain coverage for our products under government benefit programs, or to sell products to government purchasers, we may be required to track and report prices for our products, offer discounts to certain purchasers, or pay rebates on certain utilization.

In the U.S., federal and state governments continue to propose and pass legislation designed to reform delivery of, or payment for, health care, which include initiatives to reduce the cost of healthcare. For example, in March 2010, the U.S. Congress enacted the Patient Protection and Affordable Care Act and the Health Care and Education Reconciliation Act (the "Healthcare Reform Act") which expanded health care coverage through Medicaid expansion and the implementation of the individual mandate for health insurance coverage and which included changes to the coverage and reimbursement of drug products under government healthcare programs. In recent years, there have been ongoing efforts to modify or repeal all or certain provisions of the Healthcare Reform Act. For example, tax reform legislation was enacted at the end of 2017 that eliminates the tax penalty for individuals who do not maintain sufficient health insurance coverage beginning in 2019 (the so-called "individual mandate"). In addition, a case that challenges the constitutionality of the Healthcare Reform Act, California v. Texas, was argued before the U.S Supreme Court in November 2020. All provisions of the Healthcare Reform Act, except for the individual mandate to buy health insurance, remain in effect pending resolution of the case.

There have been other recent reform initiatives, including a number of initiatives focused on drug pricing. For example, legislation passed in 2019 revised how certain prices reported by manufacturers under the Medicaid Drug Rebate Program are calculated, and regulations issued in late 2020 will further revise price reporting under the Medicaid Drug Rebate Program. As another example, effective January 2022, revisions to the federal anti-kickback statute would remove protection for traditional Medicare Part D discounts offered by pharmaceutical manufacturers to pharmacy benefit managers and health plans. Some of these changes have been and may continue to be subject to legal challenge. For example, courts have temporarily enjoined a new "most favored nation" payment model for select drugs covered under Medicare Part B that was to take effect on January 1, 2021 and would limit payment based on international drug price. Additional healthcare reform efforts have sought to address certain issues related to the COVID-19 pandemic, including an expansion of telehealth coverage under Medicare and accelerated or advanced Medicare payments to healthcare providers.

There have also been other efforts by government officials or legislators to implement measures to regulate prices or payment for pharmaceutical products, including legislation on drug importation. Recently, there has been considerable public and government scrutiny of pharmaceutical pricing and proposals to address the perceived high cost of pharmaceuticals. There have been recent state legislative efforts to address drug costs, which generally have focused on increasing transparency around drug costs or limiting drug prices.

Adoption of new legislation at the federal or state level could affect demand for, or pricing of, our product candidates if approved for sale. We cannot, however, predict the ultimate content, timing, or effect of any changes to the Healthcare Reform Act or other federal and state reform efforts. There is no assurance that federal or state health care reform will not adversely affect our future business and financial results.

***Foreign Regulation***

In addition to regulations in the U.S., we may be subject to a variety of foreign regulations governing clinical trials and commercial sales and distribution of our product candidates. Whether or not we obtain FDA approval for a product candidate, we must obtain approval from the comparable regulatory authorities of foreign countries or economic areas, such as Canada, before we may commence clinical trials or market products in those countries or areas. The approval process and requirements governing the conduct of clinical trials, product licensing, pricing and reimbursement vary greatly from place to place, and the time may be longer or shorter than that required for FDA approval.

Certain countries outside of the U.S. have a process that requires the submission of a clinical trial application ("CTA") much like an IND prior to the commencement of human clinical trials. In Canada, for example, a CTA must be submitted to the competent national health authority and to independent ethics committees in which a company intends to conduct clinical trials. Once the CTA is approved in accordance with a country's requirements, clinical trial development may proceed in that country. In all cases, the clinical trials must be conducted in accordance with GCPs and other applicable regulatory requirements.

**Manufacturing**

We do not have any manufacturing facilities. We currently rely, and expect to continue to rely, on third parties for the manufacture of our product candidates for non-clinical studies and clinical trials, as well as for commercial manufacture if our product candidates receive marketing approval.

**Business Update Regarding COVID-19**

The current COVID-19 pandemic has presented a substantial public health and economic challenge around the world and is affecting our employees, patients, communities and business operations, as well as the U.S. economy and financial markets. The full extent to which the COVID-19 pandemic will directly or indirectly affect our business, results of operations and financial condition will depend on future developments that are highly uncertain and cannot be accurately predicted, including new information that may emerge concerning COVID-19, the actions taken to contain it or treat its impact and the economic impact on local, regional, national and international markets.

To date, we have been able to continue our operations and do not anticipate any material interruptions for the foreseeable future. However, we are continuing to assess the potential impact of the COVID-19 pandemic on our business and operations, including our expenses, supply chain and pre-clinical and clinical trials. Our office-based employees have been working from home since mid-March 2020. We anticipate continuing to work from home in the near-term future until the widespread availability and utilization of COVID-19 vaccines bring public health metrics to levels that allow us to safely reopen our office.

Our third-party contract manufacturing partners continue to operate their manufacturing facilities at or near normal levels. While we currently do not anticipate any interruptions in our supply chain, it is possible that the COVID-19 pandemic and response efforts may have an impact in the future on our and/or our third-party suppliers and contract manufacturing partners' ability to manufacture our products or the products of our partners.

**Information about our Executive Officers**

The following information sets forth the name, age and position of our executive officers as of February 19, 2021.

William "Chip" Clark, age 52, has served as our President and Chief Executive Officer ("CEO") since February 2011 after serving as our Chief Business Officer from August 2010 to February 2011. Mr. Clark has also served on our board of directors since February 2011. Prior to joining Genocea, he served as Chief Business Officer at Vanda Pharmaceuticals, a biopharmaceutical company he co-founded in 2004. While at Vanda, he led the company's strategic and business development activities and played a central role in raising more than $400 million through business development deals and equity financings. Prior to Vanda, Mr. Clark was a principal at Care Capital, a venture capital firm investing in biopharmaceutical companies, after serving in a variety of commercial and strategic roles at SmithKline Beecham (now GlaxoSmithKline). Mr. Clark received an M.B.A. from The Wharton School of the University of Pennsylvania and a B.A. from Harvard University.

Girish Aakalu, Ph.D., age 46, has served as our Chief Business Officer since December 2018. In this role, he leads Genocea's business development efforts. His broad skill set spans business development, corporate and R&D strategy, product portfolio management, commercial planning, and alliance management. Prior to joining Genocea, Dr. Aakalu was employed by the Ipsen Group, from May 2015 until December 2018, where he was most recently Vice President: Global Head of External Innovation, and Pfizer, Inc., from October 2007 until May 2015, where he held the title of Executive Director: Head of Strategy, Innovation & Operations for Pfizer's External R&D Innovation team prior to his departure. His previous roles also include business development and oncology pipeline market planning positions at Genentech, Inc. and life science consulting experience at L.E.K Consulting. He received both a Ph.D. in cellular and molecular neurobiology and an M.S. in biology from the California Institute of Technology and a B.A. in biophysics with general and departmental honors from Johns Hopkins University. He has also completed executive education in corporate governance at the Kellogg School of Management at Northwestern University.

Thomas Davis, M.D., age 57, has served as our Chief Medical Officer since October 2018. Dr. Davis has over 20 years of academic and industry experience in immuno-oncology and cancer drug development. Most recently, he served as Chief Medical Officer of Gadeta B.V., a Dutch cell therapy company pursuing novel cancer targets from October 2017 to April 2018, where he steered a novel cell therapy technology into first-in human clinical studies. Prior to Gadeta B.V., he served as Chief Medical Officer of Celldex from 2006 to 2017, where he led all aspects of clinical and regulatory development including strategy, tactics, and execution. While at Celldex, Dr. Davis actively built and oversaw Clinical Science, Medical Affairs, Safety, Clinical Operations, Statistics, Regulatory Affairs, and Project Management, managed collaborations with large global pharmaceutical partners, and participated in investor relations activities. He also served as Chief Medical Officer at GenVec and as Senior Director of Clinical Science at Medarex. Prior to joining the industry, Dr. Davis supervised clinical efforts at the Cancer Therapy Evaluation Program (CTEP) of the National Cancer Institute (NCI), and worked on the development of rituximab and idiotype vaccines at Stanford University. Dr. Davis received an M.D. from Georgetown University and completed a fellowship in medical oncology at Stanford University. He also received an M.S. in physiology from Georgetown University and a B.A. in biophysics from Johns Hopkins.

Diantha Duvall, age 49, has served as our Chief Financial Officer since March 2019. Prior to joining Genocea, Ms. Duvall was Vice President, Controller and Chief Accounting Officer at Bioverativ, Inc. from February 2017 to January 2019. Prior to that, she worked at Biogen Inc., serving as Global Commercial Controller from February 2016 to January 2017, and U.S. Commercial Controller from February 2015 to January 2016. She also held a number of positions at Merck and Co. from May 2009 to January 2015. Her experiences at Merck spanned roles in venture investment, business development, joint ventures, and alliances, as well as operational controls and technical accounting. She also has extensive experience in SEC reporting, Sarbanes Oxley compliance, transaction support and risk management, having held multiple health industries positions within PricewaterhouseCoopers from 1996 to 2009. Ms. Duvall has both an M.B.A and a M.S. in accounting from Northeastern University and a B.A. from Colby College.

Jessica Baker Flechtner, Ph.D., age 49, has served as our Chief Scientific Officer since February 2016 after serving as our Senior Vice President of Research from February 2014 to January 2016, and Vice President of Research from January 2010 to February 2014. From 2007 to February 2014, she held various roles of increasing seniority at Genocea. Prior to joining Genocea, Dr. Flechtner was an Immunology Consultant at BioVest International, Inc. from June 2006 to March 2007, where she guided the development of assays to evaluate the success of the company's autologous Follicular (Non-Hodgkin's) Lymphoma vaccine in patients. As a researcher at Mojave Therapeutics, Inc., or Mojave, and Antigenics Inc. (now Agenus), which acquired Mojave's intellectual property, from 2001 to 2005, Dr. Flechtner developed protein and peptide-based vaccines and immunotherapies for cancer, infectious disease, autoimmunity and allergy. She is an inventor on various pending or issued patents and has multiple peer-reviewed scientific publications. Dr. Flechtner performed her post-doctoral work in the laboratory of Dr. Harvey Cantor at the Dana Farber Cancer Institute and Harvard Medical School. She received both a Ph.D. in cellular immunology and a B.S. in animal science from Cornell University. She is a member of the American Association of Immunologists, American Association for Cancer Research, Society for the Immunotherapy of Cancer, the President's Council of Cornell Women, and Women in Bio.

Raymond D. Stapleton, Jr., Ph.D., age 50, has served as our Executive Vice President of Pharmaceutical Sciences and Manufacturing since January 2021. Prior to joining Genocea, Dr. Stapleton was President and Chief Operating Officer at American Type Culture Collection from November 2019 to January 2021, where he provided leadership for global operations. As Senior Vice President of Technical Operations at Iovance Biotherapeutics, Inc. from July 2019 to November 2019, Dr. Stapleton worked on commercial manufacturing readiness. From October 2015 through July 2019, Dr. Stapleton was employed at Synthetic Biologics, Inc. where his most recent position was Senior Vice President of Technical Operations. He also held a number of positions of increasing responsibility at Merck and Co. from 2003 to 2015, including leading a complex science, technology, and engineering organization at a manufacturing site responsible for supporting Merck's vaccine business. He has served as peer reviewer for a half dozen scientific journals and co-authored seventeen peer-reviewed manuscripts and multiple patents. Dr. Stapleton completed his post-doctoral work in the Oak Ridge National Laboratory. He received a Ph.D. in microbial ecology from The University of Tennessee – Knoxville and a B.S. in biology from Mary Washington College.

**Human Capital Resources**

As of December 31, 2020, we had 72 full-time employees, of which 54 were engaged in research and development and 18 were engaged in finance, legal, business development, human resources, facilities, information technology or other general and administrative functions. Our management executive team is comprised of our CEO and five of his direct reports who, collectively, have management responsibility for our business. Two of the six members of our management executive team are women. Across our broader population, approximately 52% of full-time employees are women. Our management executive team places significant focus and attention on matters concerning our human capital assets - particularly our diversity, capability development, and succession planning. Accordingly, we regularly review employee development and succession plans for each of our functions to identify and develop our pipeline of talent.

Our laboratory and office space is in Greater Boston, which we believe provides access to a vibrant biotech and pharmaceutical talent pool. We have programs in place to attract and retain talent, including stock-based compensation and cash performance awards as well as tuition reimbursement to support technical and other training. We also have a performance management and talent development process in which managers provide regular feedback and coaching to develop employees. None of our employees is represented by a labor union or covered by a collective bargaining agreement and we have not experienced any work stoppages. We consider our relations with our employees to be good.

**Corporate Information**

We were incorporated under the laws of the State of Delaware in August 2006. Our principal executive offices are located at 100 Acorn Park Drive, 5th Floor, Cambridge, Massachusetts 02140 and our telephone number is (617) 876-8191. Genocea® and the Genocea logo are registered trademarks.

**Available Information**

Our website address is https://www.genocea.com. Our Annual Reports on Form 10-K, Quarterly Reports on Form 10-Q, Current Reports on Form 8-K and other documents and all amendments to those reports and documents are available on or through our website without charge, as soon as reasonably practicable following the time they are filed with, or furnished to, the Securities and Exchange Commission ("SEC"). The public can also obtain any documents that we file with the SEC from the SEC's website at *https://www.sec.gov*. References to our website address do not constitute incorporation by reference of the information contained on the website, and the information contained on the website is not part of this document.

## Item 1A. Risk Factors

**Summary of Risk Factors**

Below is a summary of the principal risks that apply to Genocea or our securities. This summary does not address all of the risks that we face. Additional discussion of the risks summarized here, and other risks that we face, can be found immediately below this summary.

- We require additional financing to execute our operating plan and continue to operate as a going concern.
- We are substantially dependent on the success of the clinical development of GEN-011. Any failure to successfully develop or commercialize the GEN-011 T cell therapy, or any significant delays in doing so, will have a material adverse effect on our business, result of operations and financial condition.
- Because our active product candidates are in an early stage of clinical development, there is a high risk of failure, and we may never succeed in developing marketable products or generating product revenue.
- If we do not obtain regulatory approval for our current and future product candidates, our business will be adversely affected.
- We may find it difficult to enroll patients in our clinical trials, which could delay or prevent clinical trials of our product candidates.
- Our active product candidates, GEN-009 and GEN-011, and our future potential product candidates arising out of our immune-oncology program, are or will be based on T cell activation, which is a novel approach for vaccines, cellular therapies, immunotherapies and medical treatments.
- Our product candidates are uniquely manufactured for each patient and we may encounter difficulties in production, particularly with respect to scaling our manufacturing capabilities. If we or any of the third-party manufacturers with whom we contract encounter these types of difficulties, our ability to provide our product candidates for clinical trials or our products for patients, if approved, could be delayed or stopped, or we may be unable to maintain a commercially viable cost structure. Some of our third-party manufacturers are located outside the U.S., and we may encounter disruption in clinical material supplies due to logistics, as well as risk of adverse regulatory action due to local regulatory oversight.

- We rely on third parties to conduct technical development, non-clinical studies and clinical trials for our product candidates, including our active clinical development products, GEN-009 and GEN-011, and any other future product candidates, and if they do not properly and successfully perform their obligations to us, we may not be able to obtain regulatory approvals for our product candidates.
- We rely on third parties to conduct some or all aspects of our product manufacturing, and these third parties may not perform satisfactorily. In some instances, we may rely on a single manufacturer for certain of our products.
- If we are unable to manufacture our products or are unable to obtain regulatory approvals for a manufacturing facility for our products, we may experience delays in product development, clinical trials, regulatory approval and commercial distribution.
- We may not be successful in establishing and maintaining strategic partnerships, which could adversely affect our ability to develop and commercialize products.
- If we are unable to obtain or protect intellectual property rights related to our product candidates, we may not be able to compete effectively in our markets.
- We have in-licensed a portion of our intellectual property, and, if we fail to comply with our obligations under these arrangements, or our licensors fail to obtain and maintain intellectual property rights, we could lose such intellectual property rights or owe damages to the licensor of such intellectual property.
- Our products may cause undesirable side effects or have other properties that delay or prevent their regulatory approval or limit their commercial potential.
- Our level of indebtedness and debt service obligations could adversely affect our financial condition and may make it more difficult for us to fund our operations.
- Our largest stockholder, New Enterprise Associates, could exert significant influence over us and could limit other stockholders' ability to influence the outcome of key transactions, including any change of control.
- If our stock price is volatile, our stockholders could incur substantial losses and we may become involved in securities-related litigation, including securities class action litigation, that could divert management’s attention and harm our business and subject us to significant liabilities.
- Provisions in our charter documents and under Delaware law have anti-takeover effects that could discourage an acquisition of us by others, even if an acquisition would be beneficial to our stockholders and prevent attempts by our stockholders to replace or remove our current management.

**Risks Related to Our Financial Position and Need for Additional Capital**

***We require additional financing to execute our operating plan and continue to operate as a going concern.***

Our audited financial statements for 2020 have been prepared assuming we will continue to operate as a going concern. We plan to continue to fund our operations through public or private equity offerings, strategic transactions, proceeds from sales of our common stock under our at-the-market equity offering program (“ATM”), proceeds from sales of our common stock under our purchase agreement (the “Purchase Agreement”) with Lincoln Park Capital (“LPC”) or by other means. However, adequate additional financing may not be available to us on acceptable terms, or at all. If we are unable to raise capital when needed, or on attractive terms, we may be forced to implement further cost reduction strategies, including ceasing development of GEN-011, and/or other product candidates and other corporate activities.

As of December 31, 2020, our cash and cash equivalents were $79.8 million. We believe that we will continue to expend substantial resources for the foreseeable future developing GEN-009, GEN-011 and any other vaccine and cellular therapies targeted towards neoantigen cancer product candidates. These expenditures will include costs associated with research and development, potentially acquiring new technologies, potentially obtaining regulatory approvals and manufacturing products, as well as marketing and selling products approved for sale, if any. In addition, other unanticipated costs may arise. Because the outcome of our planned and anticipated clinical trials is highly uncertain, we cannot reasonably estimate the actual amounts necessary to successfully complete the development and commercialization of our product candidates. Furthermore, because of the significant expense associated with conducting clinical trials, we cannot be certain we will have sufficient capital to complete such trials for a given product candidate.

Our future capital requirements depend on many factors, including:

- the timing and costs of our planned clinical trials for GEN-011;
- the timing and costs to perform monitoring activities to support the GEN-009 clinical trial;
- the outcome, timing, and costs of seeking regulatory approvals;

- the initiation, progress, timing, costs, and results of preclinical studies and clinical trials for our other product candidates and potential product candidates;
- the terms and timing of any future collaborations, grants, licensing, consulting, or other arrangements that we may establish;
- the amount and timing of any payments we may be required to make, or that we may receive, in connection with the licensing, filing, prosecution, defense and enforcement of any patents or other intellectual property rights, including milestone payments, royalty payments and patent prosecution fees that we are obligated to pay pursuant to our license agreements;
- the costs of preparing, filing, and prosecuting patent applications, maintaining and protecting our intellectual property rights, and defending against intellectual property related claims;
- the extent to which we in-license or acquire other products and technologies;
- manufacture material for clinical trials and for commercial sale;
- seek regulatory approvals for any product candidates that successfully complete clinical trials;
- the receipt of marketing approval;
- maintain, protect and expand our intellectual property portfolio;
- the costs of commercialization activities for GEN-009 and GEN-011 and other product candidates, if we receive marketing approval, including the costs and timing of establishing product sales, marketing, distribution, and manufacturing capabilities;
- revenue received from commercial sales of our product candidates;
- attract and retain skilled personnel; and
- create additional infrastructure to support our operations as a public company and our product development and planned future commercialization efforts.

Based on our current operating plan, we believe that our existing cash and cash equivalents are sufficient to support our operations to mid-2022, and we have strategic plans to extend our operating cash to the end of 2022.

Our operating plan may change as a result of many factors currently unknown to us, and we may need additional funds sooner than planned. In addition, we may seek additional capital due to favorable market conditions or strategic considerations even if we believe we have sufficient funds for our current or future operating plans. Additional funds may not be available when we need them on terms that are acceptable to us, or at all. If adequate funds are not available to us when needed, we would be required to delay, limit, reduce or terminate non-clinical studies, clinical trials or other development activities for one or more of our product candidates or delay, limit, reduce or terminate our establishment of sales and marketing capabilities or other activities that may be necessary to commercialize our product candidates.

***We have incurred significant losses since our founding in 2006 and anticipate that we will continue to incur significant losses for the foreseeable future and may never achieve or maintain profitability.***

We are a clinical-stage biotechnology company, and we have not yet generated significant revenues. We have incurred net losses each year since our inception, including net losses of $43.7 million and $39.0 million for 2020 and 2019, respectively. As of December 31, 2020, we had an accumulated deficit of $374.7 million. To date, we have not commercialized any products or generated any revenues from the sale of products and do not know whether or when we will generate product revenues or become profitable. Our only source of revenue for 2020 was the material transfer agreement ("MTA") with a strategic partner, Shionogi & Co. Ltd ("Shionogi"). See **Note 3. Revenue** within the notes to the consolidated financial statements in this Annual Report on Form 10-K. To date, we have financed our operations primarily through multiple public equity offerings, private placements of our common and preferred stock and debt arrangements.

We have devoted most of our financial resources to research and development, including our clinical and non-clinical technology development and development activities. The amount of our future net losses will depend, in part, on the rate of our future expenditures and our ability to obtain funding through equity offerings or strategic transactions. We have not completed pivotal clinical studies for any product candidate, and it will be several years, if ever, before we have a product candidate ready for commercialization. Even if we obtain regulatory approval to market a product candidate, our future revenues will depend upon the size of any markets in which our product candidates have received approval, our ability to achieve sufficient market acceptance, reimbursement from third-party payors and other factors.

The net losses that we incur may fluctuate significantly from quarter to quarter and year to year, such that a period-to-period comparison of our results of operations may not be a good indication of our future performance. In any particular quarter or quarters, our operating results could be below the expectations of securities analysts or investors, which could cause our stock price to decline.

To become and remain profitable, we must succeed in developing and eventually commercializing products that generate significant revenue. This will require us to be successful in a range of challenging activities, including completing non-clinical studies and clinical trials of our product candidates, discovering additional product candidates, obtaining regulatory approval for these product candidates and manufacturing, marketing and selling any products for which we may obtain regulatory approval. We are only in the preliminary stages of most of these activities. We may never succeed in these activities and, even if we do, may never generate revenues that are significant enough to achieve profitability.

Because of the numerous risks and uncertainties associated with pharmaceutical product development, we are unable to accurately predict the timing or amount of increased expenses or when, or if, we will be able to achieve profitability. If we are required by the FDA or foreign regulatory authorities to perform studies in addition to those currently expected, or if there are any delays in completing our clinical trials or the development of any of our product candidates, our expenses could increase.

Even if we do achieve profitability, we may not be able to sustain or increase profitability on a quarterly or annual basis. Our failure to become and remain profitable would depress the value of our company and could impair our ability to raise capital, expand our business, maintain our research and development efforts, diversify our product offerings or even continue our operations. A decline in the value of our company could also cause investors to lose all or part of their investment.

***Raising additional capital may cause dilution to our existing stockholders, restrict our operations or require us to relinquish rights to our technologies or product candidates on unfavorable terms to us.***

To the extent that we raise additional capital through the sale of equity or convertible debt securities, existing ownership interests will be diluted, and the terms may include liquidation or other preferences that adversely affect the rights of our stockholders. Debt financing, if available, may involve agreements that include covenants limiting or restricting our ability to take certain actions, such as incurring additional debt, making capital expenditures or declaring dividends. If we raise additional funds through strategic partnerships with third parties, we may have to relinquish valuable rights to our technologies or product candidates, future revenue streams, research programs or product candidates or grant licenses on terms that are not favorable to us. If we are unable to raise additional capital when needed, we would be required to delay, limit, reduce or terminate our product development or commercialization efforts for GEN-009, GEN-011, or our other product candidates.

***Our stockholders will experience substantial additional dilution if outstanding warrants are exercised for common stock.***

As of February 18, 2021, there were approximately 51.0 million shares of common stock issuable upon the exercise of warrants, having a weighted average exercise price of $2.26 per share. The exercise of outstanding warrants for common stock would be substantially dilutive to existing stockholders. Any dilution or potential dilution may cause our stockholders to sell their shares, which may contribute to a downward movement in the stock price of our common stock.

**Risks Related to Clinical Development, Regulatory Review and Approval of Our Product Candidates**

***We are substantially dependent on the success of the clinical development of GEN-011. Any failure to successfully develop or commercialize the GEN-011 T cell therapy, or any significant delays in doing so, will have a material adverse effect on our business, result of operations and financial condition.***

We are now currently investing a significant portion of our efforts and financial resources in the development of the GEN-011, an adoptive T cell therapy which is currently in a Phase 1/2a clinical trial. Our ability to generate product revenue depends heavily on the success of clinical trials for GEN-011 and the successful development and commercialization of GEN-011. The successful development and commercialization of GEN-011 will depend on several factors, including the following:

- successful completion of all required clinical trials of GEN-011;
- obtaining marketing approvals from regulatory authorities for GEN-011;
- establishing manufacturing and commercialization arrangements between ourselves and third parties;
- establishing an acceptable safety and efficacy profile of GEN-011; and
- the availability of reimbursement to patients from healthcare payors for GEN-011.

Any failure to successfully develop or commercialize GEN-011 or any significant delays in doing so will have a material adverse effect on our business, results of operations and financial condition.

***Because our active product candidates are in an early stage of clinical development, there is a high risk of failure, and we may never succeed in developing marketable products or generating product revenue.***

We are currently conducting Phase 1/2a clinical trials for our GEN-009 and GEN-011 programs. A decision to stop either or both of these trials would result in a delay in the clinical progress, approval and commercialization of the affected programs. Even if the results are successful, such results may not be replicated in later and larger clinical trials. Among other reasons for the potential failure of earlier, smaller clinical trials to be replicated in later, larger clinical trials is the fact that manufacturing scale up is necessary to prepare for Phase 3 development and commercialization. Our product candidates may require complex manufacturing processes and scaling up these processes can cause changes in the product that may not be apparent until the product is further tested during Phase 3 trials.

If the results of our future clinical trials are inconclusive with respect to the efficacy of our product candidates or if we do not meet our clinical endpoints with statistical significance or if there are safety concerns or AEs associated with our product candidates, we may be prevented or delayed in obtaining marketing approval for our product candidates. Alternatively, even if we obtain regulatory approval, that approval may be for indications or patient populations that are not as broad as intended or desired or may require labeling that includes significant use or distribution restrictions or safety warnings. We may also be required to perform additional or unanticipated clinical trials to obtain approval or be subject to additional post-marketing testing requirements to maintain regulatory approval. In addition, regulatory authorities may withdraw their approval of the product or impose restrictions on its distribution in the form of a modified risk evaluation and mitigation strategy.

***If we do not obtain regulatory approval for our current and future product candidates, our business will be adversely affected.***

Our product candidates are subject to extensive governmental regulations relating to, among other things, research, clinical trials, manufacturing, import, export and commercialization. In order to obtain regulatory approval for the commercial sale of any product candidate, we must demonstrate through extensive non-clinical studies and clinical trials that the product candidate is safe and effective for use in each target indication. Clinical trials are expensive, time-consuming and uncertain as to outcome. We may gain regulatory approval for GEN-009, GEN-011 or our other current or potential future clinical and non-clinical product candidates in some but not all of the territories available or some but not all of the target indications, resulting in limited commercial opportunity for our product candidates, or we may never obtain regulatory approval for these product candidates for any indication in any jurisdiction.

***We may find it difficult to enroll patients in our clinical trials, which could delay or prevent clinical trials of our product candidates.***

Identifying and qualifying patients to participate in clinical trials of our product candidates is critical to our success. The timing of our clinical trials depends on the speed at which we can recruit patients to participate in testing our product candidates. If patients are unwilling to participate in our studies because of negative publicity from AEs in the biotechnology industries or for other reasons, including competitive clinical trials for similar patient populations, the timeline for recruiting patients, conducting studies and obtaining regulatory approval of potential products may be delayed or prevented. These delays could result in increased costs, delays in advancing our product development, delays in testing the effectiveness of our technology or termination of the clinical trials altogether.

We may not be able to identify, recruit and enroll a sufficient number of patients, or those with required or desired characteristics to achieve diversity in a study, to complete our clinical trials in a timely manner. Patient enrollment is affected by factors including:

- severity of the disease under investigation;
- design of the study protocol;
- size of the patient population;
- eligibility criteria for the trial in question;
- perceived risks and benefits of the product candidate under study;
- proximity and availability of clinical trial sites for prospective patients;
- availability of competing therapies and clinical trials;
- efforts to facilitate timely enrollment in clinical trials;
- delays as a result of the impact of the COVID-19 pandemic on clinical trial recruitment;
- patient referral practices of physicians; and
- ability to monitor patients adequately during and after treatment.

We may not be able to initiate or continue clinical trials if we cannot enroll a sufficient number of eligible patients to participate in the clinical trials required by regulatory agencies. If we have difficulty enrolling a sufficient number of patients to conduct our clinical trials as planned, we may need to delay, limit or terminate ongoing or planned clinical trials, any of which would have an adverse effect on our business.

***We may not be able to comply with requirements of foreign jurisdictions in conducting trials outside of the U.S.***

To date, we have not conducted any clinical trials outside of the U.S. Our ability to successfully initiate, enroll and complete a clinical trial in any foreign country, should we attempt to do so, is subject to numerous risks unique to conducting business in foreign countries, including:

- difficulty in establishing or managing relationships with contract research organizations ("CROs") and physicians;
- different standards for the conduct of clinical trials;
- our inability to locate qualified local consultants, physicians and partners;
- 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 treatment; and
- the acceptability of data obtained from studies conducted outside the U.S. to the FDA in support of a BLA.

If we fail to successfully meet requirements for the conduct of clinical trials outside of the U.S., we may be delayed in obtaining, or be unable to obtain, regulatory approval for our product candidates.

***We may encounter substantial delays in our clinical trials or we may fail to demonstrate safety and efficacy to the satisfaction of applicable regulatory authorities.***

Before obtaining marketing approval from regulatory authorities for the sale of our product candidates, we must conduct extensive clinical trials to demonstrate the safety and efficacy of the product candidates for the intended indications. Clinical testing is expensive, time-consuming and uncertain as to outcome. We cannot guarantee that clinical trials will be conducted as planned or completed on schedule, if at all. A failure of one or more clinical trials can occur at any stage of testing. Events that may prevent successful or timely completion of clinical development include:

- delays caused by us or third parties in conducting clinical trials for GEN-009 and GEN-011;
- delays by us in reaching a consensus with regulatory agencies on trial design;
- delays in reaching agreement on acceptable terms with prospective CROs and clinical trial sites;
- delays in initiating clinical sites for our GEN-011 program due to COVID-19;
- delays in obtaining required IRB approval at each clinical trial site;
- imposition of a clinical hold by regulatory agencies or an IRB for any reason, including safety concerns raised by other clinical trials of similar vaccines that may reflect an unacceptable risk with GEN-009 or GEN-011 or after an inspection of clinical operations or trial sites;
- failure to perform in accordance with the FDA's GCPs or applicable regulatory guidelines in other countries;
- delays in the testing, validation, manufacturing and delivery of the product candidates to the clinical sites;
- delays caused by patients not completing participation in a trial or not returning for post-treatment follow-up;
- clinical trial sites or patients dropping out of a trial or failing to complete dosing;
- occurrence of serious AEs in clinical trials that are associated with the product candidates that are viewed to outweigh its potential benefits; or
- changes in regulatory requirements and guidance that require amending or submitting new clinical protocols.

Delays, including delays caused by the above factors, can be costly and could negatively affect our ability to complete a clinical trial. We cannot give any assurance that we will be able to resolve any delay caused by the factors described above or any other factors, on a timely basis or at all. If we are not able to successfully initiate and complete subsequent clinical trials, we will not be able to obtain regulatory approval and will not be able to commercialize our product candidates.

***Our active product candidates, GEN-009 and GEN-011, and our future potential product candidates arising out of our immuno-oncology program, are or will be based on T cell activation, which is a novel approach for vaccines, cellular therapies, immunotherapies and medical treatments.***

We have concentrated our research and development efforts on T cell vaccine and immunotherapy technology, which is a novel approach for vaccines, cellular therapies, immunotherapies and medical treatments, and our future success is highly dependent on the successful development of T cell immunotherapies in general, and our active development product and current and future product candidates in particular. Consequently, it may be difficult for us to predict the time and cost of product development. Unforeseen problems with the T cell approach to vaccines and cellular therapies may prevent further development or approval of our current and future product candidates. There can be no assurance that any development problems we or others researching T cell vaccines and cellular therapies may experience in the future will not cause significant delays or unanticipated costs, or that such development problems can be solved. Because of the novelty of this approach, there may be unknown safety risks associated with the vaccines and cellular therapies that we develop. Regulatory agencies such as the FDA may require us to conduct extensive safety testing prior to approval to demonstrate a low risk of rare and severe AEs caused by the vaccines and cellular therapies. If approved, the novel mechanism of action of the vaccines and cellular therapies may adversely affect physician and patient perception and uptake of our products.

***Our product candidates are uniquely manufactured for each patient and we may encounter difficulties in production, particularly with respect to scaling our manufacturing capabilities. If we or any of the third-party manufacturers with whom we contract encounter these types of difficulties, our ability to provide our product candidates for clinical trials or our products for patients, if approved, could be delayed or stopped, or we may be unable to maintain a commercially viable cost structure. Some of our third-party manufacturers are located outside the U.S., and we may encounter disruption in clinical material supplies due to logistics, as well as risk of adverse regulatory action due to local regulatory oversight.***

We custom design and manufacture our product candidates. Manufacturing unique lots of these product candidates is susceptible to product loss or failure due to issues with:

- logistics associated with the collection of a patient's tumor or blood;
- batch-specific manufacturing failures or issues that arise due to the uniqueness of each patient-specific batch that may not have been foreseen;
- quality control testing failures;
- unexpected failures of batches placed on stability;
- novel assays, cell selection or other components within our manufacturing processes;
- significant costs associated with individualized manufacturing that may adversely affect our ability to continue development;
- successful and timely manufacture and release of the patient-specific batch;
- shipment issues encountered during transport of the batch to the site of patient care; and
- our reliance on single-source suppliers.

As our product candidates are manufactured for each individual patient, we will be required to maintain a chain of identity with respect to each patient's sample, sequence data derived from such sample, analyze results of such patient's immunologic profile, and the custom manufactured product for each patient. Maintaining such a chain of identity is difficult and complex, and failure to do so could result in product mix-up, adverse patient outcomes, loss of product, or regulatory action, including withdrawal of any approved products from the market. Further, as our product candidates are developed through early-stage clinical studies to later-stage clinical trials towards approval and commercialization, we expect that multiple aspects of the complicated collection, analysis, manufacture and delivery processes will be modified in an effort to optimize processes and results. These changes may not achieve the intended objectives, and any of these changes could cause our product candidates to perform differently than we expect, potentially affecting the results of clinical trials.

***Novel vaccine adjuvants, including those in our GEN-009 product candidate, may pose an increased safety risk to patients.***

Adjuvants are compounds that are added to vaccine antigens to enhance the activation of the immune system and improve the immune response and efficacy of vaccines. Development of vaccines with novel adjuvants requires evaluation in larger numbers of patients prior to approval than would be typical for therapeutic drugs. Guidelines for evaluation of vaccines with novel adjuvants have been established by the FDA and other regulatory bodies and expert committees. Our product candidates, including GEN-009, may include one or more novel adjuvants. Any neoantigen cancer vaccine, because of the presence of an adjuvant, may have side effects considered to pose too great a risk to patients to warrant approval of the vaccine.

***If we fail to obtain regulatory approval in jurisdictions outside the U.S., we will not be able to market our products in those jurisdictions.***

We intend to market our product candidates, if approved, in international markets. Such marketing will require separate regulatory approvals in each market and compliance with numerous and varying regulatory requirements. The approval procedures vary among countries and may involve requirements for additional testing, and the time required to obtain approval may differ from that required to obtain FDA approval. Approval by the FDA does not ensure approval by regulatory authorities in other countries or jurisdictions, and approval by one foreign regulatory authority does not ensure approval by regulatory authorities in other foreign countries or by the FDA. The foreign regulatory approval process may include all of the risks associated with obtaining FDA approval. We may not obtain foreign regulatory approvals on a timely basis, if at all. We may not be able to file for regulatory approvals and may not receive necessary approvals to commercialize our vaccines in any market.

***Even if we receive regulatory approval for our product candidates, such immunotherapies will be subject to ongoing regulatory review, which may result in significant additional expense. Additionally, our product candidates, including our active development products, GEN-009, GEN-011 and any other potential future immunotherapy product candidates, if approved, could be subject to labeling and other restrictions, and we may be subject to penalties if we fail to comply with regulatory requirements or experience unanticipated problems with our products.***

Any regulatory approvals that we receive for our product candidates may also be subject to limitations on the approved indications for which the product may be marketed or to conditions of approval, or contain requirements for potentially costly post-marketing testing, including Phase 4 clinical trials, and surveillance to monitor the safety and efficacy of the vaccine or immunotherapy potentially over many years. In addition, if the FDA approves any of our product candidates, the manufacturing processes, labeling, packaging, distribution, AE reporting, storage, advertising, promotion and recordkeeping for the product will be subject to extensive and ongoing regulatory requirements. These requirements include submissions of safety and other post-marketing information and reports, registration, as well as continued compliance with current good manufacturing practice ("cGMP") and GCP, for any clinical trials that we conduct post-approval.

Later discovery of previously unknown problems with an approved product, including AEs of unanticipated severity or frequency, or with manufacturing operations or processes, or failure to comply with regulatory requirements, may result in, among other things:

- restrictions on the marketing or manufacturing of the product, withdrawal of the product from the market, or voluntary or mandatory product recalls;
- fines, warning letters, or holds on clinical trials;
- refusal by the FDA to approve pending applications or supplements to approved applications filed by us, or suspension or revocation of product license approvals;
- product seizure or detention, or refusal to permit the import or export of products; and
- injunctions or the imposition of civil, criminal and/or administrative penalties, damages, monetary fines, disgorgement, exclusion from participation in Medicare, Medicaid and other federal health care programs, and curtailment or restructuring of our operations.

The FDA's policies may change and additional government regulations may be enacted that could affect regulatory approval that we have received for our product candidates. We cannot predict the likelihood, nature or extent of government regulation that may arise from future legislation or administrative action, either in the U.S. or abroad. If we are slow or unable to adapt to changes in existing requirements or the adoption of new requirements or policies, or not able to maintain regulatory compliance, we may lose any marketing approval that may have been obtained and we may not achieve or sustain profitability, which would adversely affect our business.

**Risks Related to Our Reliance on Third Parties**

***We rely on third parties to conduct technical development, non-clinical studies and clinical trials for our product candidates, including our active clinical development products, GEN-009 and GEN-011, and any other future product candidates, and if they do not properly and successfully perform their obligations to us, we may not be able to obtain regulatory approvals for our product candidates.***

We rely, and intend to continue to rely on, on third party CROs and other third parties to assist in managing, monitoring and otherwise carrying out our GEN-009 and GEN-011 clinical trials. We expect to continue to rely on third parties, such as CROs, clinical data management organizations, medical institutions and clinical investigators, to conduct our clinical trials. We compete with many other companies for the resources of these third parties. The third parties on whom we rely generally may terminate their engagements at any time and having to enter into alternative arrangements would delay development and commercialization of our product candidates.

Our reliance on these third parties for research and development activities will reduce our control over these activities but will not relieve us of our responsibilities. For example, the FDA and foreign regulatory authorities require compliance with regulations and standards, including GCP, for designing, conducting, monitoring, recording, analyzing, and reporting the results of clinical trials to assure that the data and results are credible and accurate and that the rights, integrity and confidentiality of trial participants are protected. Although we rely on third parties to conduct our clinical trials, we are responsible for ensuring that each of these clinical trials is conducted in accordance with its general investigational plan and protocol.

Furthermore, these third parties may also have relationships with other entities, some of which may be our competitors. If these third parties do not successfully carry out their duties under their agreements, if the quality or accuracy of the data they obtain is compromised due to their failure to adhere to clinical trial protocols or to regulatory requirements, or if they otherwise fail to comply with clinical trial protocols or meet expected deadlines, the clinical trials of our product candidates may not meet regulatory requirements. If clinical trials do not meet regulatory requirements or if these third parties need to be replaced, non-clinical development activities or clinical trials may be extended, delayed, suspended or terminated. If any of these events occur, we may not be able to obtain regulatory approval of our product candidates on a timely basis or at all.

We also expect to rely on other third parties to store and distribute drug supplies for our clinical trials. Any performance failure on the part of our distributors could delay clinical development or marketing approval of our product candidates or commercialization of our products, producing additional losses and depriving us of potential product revenue.

***We rely on third parties to conduct some or all aspects of our product manufacturing, and these third parties may not perform satisfactorily. In some instances, we may rely on a single manufacturer for certain of our products.***

We do not have any manufacturing facilities. We do not expect to independently conduct all aspects of our product manufacturing. We intend to rely on third parties with respect to manufacturing GEN-009 and GEN-011, and in some instances we may rely on a single manufacturer for certain of our products. This reliance on third parties increases the risk that we will not have sufficient quantities of our product candidates or products or such quantities at an acceptable cost or quality, which could delay, prevent or impair our development or commercialization efforts.

Any of these third parties may terminate their engagement with us at any time. If we need to enter into alternative arrangements, it could delay our product development activities. Our reliance on these third parties for manufacturing activities will reduce our control over these activities but will not relieve us of our responsibility to ensure compliance with all required regulations regarding manufacturing.

Reliance on third party manufacturers entails risks to which we would not be subject if we manufactured the product candidates ourselves, including:

- the inability to negotiate manufacturing agreements with third parties under commercially reasonable terms;
- reduced control as a result of using third party manufacturers for all aspects of manufacturing activities, including regulatory compliance and quality assurance;
- termination or nonrenewal of manufacturing agreements with third parties in a manner or at a time that is costly or damaging to us;
- the unavailability of a manufacturer that is capable of, or that has the capacity to, manufacture our clinical supply that results in delays or additional manufacturing costs;
- the possible misappropriation of our proprietary information, including our trade secrets and know-how or infringement of third-party intellectual property rights by our contract manufacturers; and
- disruptions to the operations of our third-party manufacturers or suppliers caused by conditions unrelated to our business or operations, including the bankruptcy of the manufacturer or supplier.

Any of these events could lead to clinical trial delays or failure to obtain regulatory approval or affect our ability to successfully commercialize future products. Some of these events could be the basis for FDA action, including injunction, recall, seizure or total or partial suspension of production.

Third-party manufacturers may not be able to comply with cGMP regulations or similar regulatory requirements outside the U.S. Our failure, or the failure of our third-party manufacturers, to comply with applicable regulations could result in sanctions being imposed on us, including clinical holds, fines, injunctions, civil penalties, delays, suspension or withdrawal of approvals, license revocation, seizures or recalls of product candidates or products, operating restrictions and criminal prosecutions, any of which could significantly and adversely affect supplies of our products.

Our product candidates and any products that we may develop may compete with other product candidates and products for access to manufacturing facilities. There are a limited number of manufacturers that operate under cGMP regulations and that might be capable of manufacturing for us.

Any performance failure on the part of our existing or future manufacturers could delay clinical development or marketing approval. We do not currently have arrangements in place for redundant supply or a second source for GEN-009 and GEN-011. If our current contract manufacturers cannot perform as agreed, we may be required to replace such manufacturers. Although we believe that there are several potential alternative manufacturers who could manufacture our product candidates, we may incur added costs and delays in identifying and qualifying any such replacement.

Our current and anticipated future dependence upon others for the manufacture of our product candidates or products may adversely affect our future profit margins and our ability to commercialize any products that receive marketing approval on a timely and competitive basis.

***If we are unable to manufacture our products or are unable to obtain regulatory approvals for a manufacturing facility for our products, we may experience delays in product development, clinical trials, regulatory approval and commercial distribution.***

We expect to rely on third-parties for the manufacture of clinical and, if necessary, commercial quantities of our product candidates. These third-party manufacturers must also receive FDA approval before they can produce clinical material or commercial products. Our products may be in competition with other products for access to these facilities and may be subject to delays in manufacture if third-parties give other products greater priority. We may not be able to enter into any necessary third-party manufacturing arrangements on acceptable terms, or on a timely basis. In addition, we may have to enter into technical transfer agreements and share our know-how with the third-party manufacturers, which can be time-consuming and may result in delays.

Our reliance on contract manufacturers may adversely affect our operations or result in unforeseen delays or other problems beyond our control. Because of contractual restraints and the limited number of third-party manufacturers with the expertise, required regulatory approvals and facilities to manufacture our vaccines and cellular therapies on a commercial-scale, replacement of a manufacturer may be expensive and time-consuming and may cause interruptions in the production of our vaccine. A third-party manufacturer may also encounter difficulties in production. These problems may include:

- difficulties with production costs and scale-up;
- unavailability of raw materials and supplies;
- insufficient quality control and assurance;
- shortages of qualified personnel;
- failure to comply with strictly enforced federal, state and foreign regulations that vary in each country where product might be sold; and
- lack of capital funding.

As a result, any delay or interruption could have a material adverse effect on our business, financial condition, results of operations and cash flows.

***We may not be successful in establishing and maintaining strategic partnerships, which could adversely affect our ability to develop and commercialize products.***

A part of our strategy is to evaluate and, as deemed appropriate, enter into partnerships in the future when strategically attractive, including potentially with major biotechnology or pharmaceutical companies. We face significant competition in seeking appropriate partners for our product candidates, and the negotiation process is time-consuming and complex. In order for us to successfully partner our product candidates, potential partners must view these product candidates as economically valuable in markets they determine to be attractive in light of the terms that we are seeking and other available products for licensing by other companies. Even if we are successful in our efforts to establish strategic partnerships, the terms that we agree upon may not be favorable to us, and we may not be able to maintain such strategic partnerships if, for example, development or approval of a product is delayed or sales of an approved product are disappointing. Any delay in entering into strategic partnership agreements related to our product candidates could delay the development and commercialization of our product candidates and reduce their competitiveness even if they reach the market.

In addition, our strategic partners may breach their agreements with us, and we may not be able to adequately protect our rights under these agreements. Furthermore, our strategic partners will likely negotiate for certain rights to control decisions regarding the development and commercialization of our product candidates, if approved, and may not conduct those activities in the same manner as we would do so.

If we fail to establish and maintain strategic partnerships related to our product candidates, we will bear all of the risk and costs related to the development of any such product candidate, and we may need to seek additional financing, hire additional employees and otherwise develop expertise which we do not have and for which we have not budgeted. This could negatively affect the development of any unpartnered product candidate.

In addition, we are currently seeking to establish strategic partnerships with companies with adjuvant and delivery technologies for our neoantigen cancer vaccine candidates. If we are unable to successfully enter into these partnerships, our ability to develop our neoantigen cancer vaccine candidates may be adversely affected.

**Risks Related to Our Intellectual Property**

***If we are unable to obtain or protect intellectual property rights related to our product candidates, we may not be able to compete effectively in our markets.***

We rely upon a combination of patents, patent applications, know-how and confidentiality agreements to protect the intellectual property related to our platform technology and product candidates. The patent position of biotechnology companies is generally uncertain because it involves complex legal and factual considerations. The standards applied by the U.S. Patent and Trademark Office ("U.S. PTO") and foreign patent offices in granting patents are not always applied uniformly or predictably. For example, there is no uniform worldwide policy regarding patentable subject matter or the scope of claims allowable in biotechnology patents. The patent applications that we own or in-license may fail to result in issued patents with claims that cover our discovery platform or product candidates in the U.S. or in other countries. There is no assurance that all potentially relevant prior art relating to our patents and patent applications or those of our licensors has been found, and prior art that we have not disclosed could be used by a third party to invalidate a patent or prevent a patent from issuing from a pending patent application. Even if patents do successfully issue and even if such patents cover our discovery platform or product candidates, third parties may challenge their validity, enforceability or scope, which may result in such patents being narrowed or invalidated. Furthermore, even if they are unchallenged, our patents and patent applications, or those of our licensors, may not adequately protect our platform technology, provide exclusivity for our product candidates, prevent others from designing around our patents with similar products, or prevent others from operating in jurisdictions in which we did not pursue patent protection. Any of these outcomes could impair our ability to prevent competition from third parties, which may have an adverse impact on our business.

If patent applications we hold or have in-licensed with respect to our platform or product candidates fail to issue, if their breadth or strength of protection is threatened, or if they fail to provide meaningful exclusivity for our product candidates or ATLAS discovery platform, it could dissuade companies from collaborating with us and could limit or destroy our ability to develop or commercialize one or more of our products, or even any product. We or our licensors have filed several patent applications covering aspects of our product candidates. We cannot offer any assurances about which, if any, patents will be issued, the breadth of any such patents or whether any issued patents will be found invalid and unenforceable or will be challenged by third parties. Any successful opposition to these patent applications, or patents that may issue from them, or to any other patent applications or patents owned by or licensed to us, could deprive us of rights necessary for the successful commercialization of any product candidate that we may develop. Since patent applications in the U.S. and most other countries are confidential for a period of time after filing, and some remain so until issued, we cannot be certain that we or our licensors were the first to file a patent application relating to any particular aspect of a product candidate.

In the U.S., for patent applications filed prior to March 16, 2013, assuming the other requirements for patentability are met, the first to invent is entitled to the patent, while outside the U.S., the first to file a patent application is entitled to the patent. On March 16, 2013, the U.S. transitioned to a ‘first to file’ system more like that in the rest of the world in that the first inventor to file a patent application is entitled to the patent. Under either the prior system or current one, third parties are allowed to submit prior art prior to the issuance of a patent. Furthermore, both the U.S. and foreign patent systems permit third parties or, in some cases, the patent authorities themselves, to initiate proceedings challenging the scope and / or validity of issued patents, including for example, opposition, derivation, reexamination, *inter partes* review or interference proceedings. An adverse determination against our or our licensor's patent rights in any such submission, proceeding or litigation could reduce the scope of, or invalidate, our patent rights, which could adversely affect our competitive position with respect to third parties.

In addition, patents have a limited lifespan. In most countries, including the U.S., the natural expiration of a patent is 20 years from the date it is filed. Various extensions of patent term may be available in particular countries, however in all circumstances the life of a patent, and the protection it affords, has a limited term. If we encounter delays in obtaining regulatory approvals, the period of time during which we could market a product under patent protection could be reduced. We expect to seek extensions of patent terms where these are available in any countries where we are prosecuting patents. Such possible extensions include those permitted under the Drug Price Competition and Patent Term Restoration Act of 1984 in the U.S., which permits a patent term extension of up to five years to cover an FDA-approved product. However, the applicable authorities, including the FDA in the U.S., and any equivalent regulatory authority in other countries, may not agree with our assessment of whether such extensions are available, and may refuse to grant extensions to our patents, or may grant more limited extensions than we request. If this occurs, our competitors may be able to take advantage of our investment in development and clinical trials by referencing our clinical and non-clinical data, and then may be able to launch their product earlier than might otherwise be the case.

Filing, prosecuting and enforcing patents on our platform or product candidates in all countries throughout the world would be prohibitively expensive, and our intellectual property rights in some countries outside the U.S. could be less extensive than those in the U.S. 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 U.S. Consequently, we may not be able to prevent third parties from infringing our patents in all countries outside the U.S., or from selling or importing products that infringe our patents in and into the U.S. or other jurisdictions. Competitors may use our technologies in jurisdictions where we have not obtained patent protection to develop their own products and, further, may export otherwise infringing products to territories where we have patent protection, but enforcement is not as strong as that in the U.S. These products may compete with our products and our patents or other intellectual property rights may not be effective or sufficient to prevent them from competing.

Any loss of, or failure to obtain, patent protection could have a material adverse impact on our business. We may be unable to prevent competitors from entering the market with a product that is similar to or the same as our products.

***We may become involved in lawsuits to defend or enforce our intellectual property, which could be expensive, time consuming and unsuccessful.***

Competitors may infringe our patents or misappropriate or otherwise violate our intellectual property rights, and competitors or other third parties may challenge the validity or enforceability of those rights. To counter infringement or unauthorized use, or to defend against other challenges, litigation may be necessary to enforce or defend our intellectual property rights, to protect our trade secrets and/or to determine the validity and scope of our own intellectual property rights or the proprietary rights of others. Such litigation can be expensive and time consuming. Many of our current and potential competitors have the ability to dedicate substantially greater resources to litigate intellectual property rights than we can. Accordingly, despite our efforts, we may not be able to prevent third parties from infringing upon or misappropriating our intellectual property. Litigation could result in substantial costs and diversion of management resources, which could harm our business and financial results. In addition, in contested proceedings, a court or agency may decide that a patent owned by or licensed to us is invalid or unenforceable or may refuse to stop the other party from using the technology at issue on the grounds that our patents do not cover the technology in question. An adverse result in any litigation proceeding could put one or more of our patents at risk of being invalidated, held unenforceable or interpreted narrowly. Furthermore, 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.

***Third-party claims of intellectual property infringement or misappropriation may prevent or delay our development and commercialization efforts.***

Our commercial success depends in part on our ability to develop, manufacture, market and sell our product candidates, and to use our or our licensors' proprietary technologies without infringing the patents and proprietary rights of third parties. There is a substantial amount of litigation, both within and outside the U.S., involving patent and other intellectual property rights in the biotechnology and pharmaceutical industries, including patent infringement lawsuits, interferences, oppositions, reexamination, and *inter partes* review proceedings before the U.S. PTO and corresponding foreign patent offices. Numerous U.S. and foreign issued patents and pending patent applications owned by third parties exist in the fields in which we are developing and may develop our product candidates. 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 patent rights of third parties.

Third parties may assert that we are employing their proprietary technology without authorization. There may be third-party patents or patent applications with claims for example to materials, formulations, methods of manufacture, methods of analysis, and/or methods for treatment related to the use or manufacture of our products or product candidates. In some cases, we may have failed to identify such relevant third-party patents or patent applications. For example, applications filed before November 29, 2000 and certain applications filed after that date that will not be filed outside the U.S. remain confidential until patents issue. Except for the preceding exceptions, patent applications in the U.S. and elsewhere are generally published only after a waiting period of approximately 18 months after the earliest filing. Therefore, patent applications covering our platform technology or our products or product candidates could have been filed by others without our knowledge. Additionally, pending patent applications which have been published can, subject to certain limitations, be later amended in a manner that could cover our platform technologies, our products or product candidates and/or the use, analysis, and/or manufacture of our product candidates.

If any third-party patents were held by a court of competent jurisdiction to cover aspects of our materials, formulations, methods of manufacture, methods of analysis, and/or methods for treatment, the holders of any such patents would be able to block our ability to develop and commercialize the applicable product candidate until such patent expired or unless we obtain a license. Such licenses may not be available on acceptable terms, if at all. Even if we were able to obtain a license, the rights may be nonexclusive, which could result in our competitors gaining access to the same intellectual property. Ultimately, we could be prevented from commercializing a product, or be forced to cease some aspect of our business operations, if, as a result of actual or threatened patent infringement claims, we are unable to enter into licenses on acceptable terms.

Parties making claims against us may obtain injunctive or other equitable relief, which could effectively block our ability to further develop and commercialize one or more of our product candidates. Defending against claims of patent infringement or misappropriation of trade secrets could be costly and time consuming, regardless of the outcome. Thus, even if we were to ultimately prevail, or to settle at an early stage, such litigation could burden us with substantial unanticipated costs. In addition, litigation or threatened litigation could result in significant demands on the time and attention of our management team, distracting them from the pursuit of other company business. In the event of a successful claim of infringement against us, we may have to pay substantial damages, including treble damages and attorneys' fees for willful infringement, pay royalties, redesign our infringing products or obtain one or more licenses from third parties, which may be impossible or require substantial time and monetary expenditure.

We may face a claim of misappropriation if a third party believes that we inappropriately obtained and used trade secrets of such third party. If we are found to have misappropriated a third party's trade secrets, we may be prevented from further using such trade secrets, limiting our ability to develop our product candidates, and we may be required to pay damages. During the course of any patent or other intellectual property litigation, there could be public announcements of the results of hearings, rulings on motions, and other interim proceedings in the litigation. If securities analysts or investors regard these announcements as negative, the perceived value of our products, programs, or intellectual property could be diminished. Accordingly, the market price of our common stock may decline.

***We have in-licensed a portion of our intellectual property, and, if we fail to comply with our obligations under these arrangements, or our licensors fail to obtain and maintain intellectual property rights, we could lose such intellectual property rights or owe damages to the licensor of such intellectual property.***

We are a party to a number of license and collaboration agreements that are important to our business, and we may enter into additional license or collaboration agreements in the future. For example, our discovery platform is built, in part, around patents exclusively in-licensed from academic or research institutions. See "*Business - License Agreements*" for a description of our in-license agreement with Harvard. These and other licenses may not provide exclusive rights to use such intellectual property and technology in all relevant fields of use and in all territories in which we may wish to develop or commercialize our technology and product candidates in the future. It is possible that we may be unable to obtain additional licenses at a reasonable cost or on reasonable terms, if at all. As a result, we may not be able to prevent competitors from developing and commercializing competitive products in territories included in all of our licenses. In that event, we may be required to expend significant time and resources to redesign our product candidates or to develop or license replacement technology, all of which may not be feasible on a technical or commercial basis. If we are unable to do so, we may be unable to develop or commercialize the affected product candidates, which could harm our business significantly.

Our existing license agreements impose, and we expect that future license agreements will impose, various diligence, milestone payment, royalty and other obligations on us. For example, in our existing license agreements, and we expect in our future agreements, patent prosecution of our licensed technology may be controlled by the licensor, and we may be required to reimburse the licensor for their costs of patent prosecution. If our licensors fail to obtain and maintain patent or other protection for the proprietary intellectual property we license from them, we could lose our rights to the intellectual property or our exclusivity with respect to those rights, and our competitors could market competing products covered by the intellectual property. Further, in our license agreements we may be responsible for bringing any actions against any third party for infringing the patents we have licensed. If there is any conflict, dispute, disagreement or issue of non-performance between us and our licensing partners regarding our rights or obligations under the license agreements, including any such conflict, dispute or disagreement arising from our failure to satisfy payment obligations under any such agreement, we may owe damages, our licensor may have a right to terminate the affected license, and our ability to utilize the affected intellectual property in our drug discovery and development efforts, and our ability to enter into collaboration or marketing agreements for an affected product candidate, may be adversely affected. For example, disputes may arise regarding intellectual property subject to a licensing agreement, including the scope of rights granted under the license agreement and other interpretation-related issues; the extent to which our technology infringes the intellectual property of the licensor that is not subject to the licensing agreement; the sublicensing of patent and other rights under any collaborative development relationships; our diligence obligations under the license agreement and what activities satisfy those diligence obligations; the inventorship or ownership of inventions and know-how resulting from the joint creation or use of intellectual property by our licensors and us and our partners; and the priority of invention of patented technology. If disputes over intellectual property that we have licensed prevent or impair our ability to maintain our current licensing arrangements on acceptable terms, we may be unable to successfully develop and commercialize the affected product candidates.

***Confidentiality agreements with employees and third parties may not prevent unauthorized disclosure of proprietary information.***

In addition to the protection afforded by patents, we rely on confidentiality agreements to protect proprietary know-how that may not be patentable or that we may elect not to patent, processes for which patents are difficult to enforce and any other elements of our platform technology and discovery and development processes that involve proprietary know-how, information or technology that is not covered by patents. We seek to protect our proprietary technology and processes, in part, by entering into confidentiality agreements with our employees, consultants, and outside scientific advisors, contractors and collaborators. Although we use reasonable efforts to protect our know-how, our employees, consultants, contractors, or outside scientific advisors might intentionally or inadvertently disclose our know-how information to competitors. In addition, competitors may otherwise gain access to our know-how or independently develop substantially equivalent information and techniques.

Enforcing a claim that a third party illegally obtained and is using any of our know-how is expensive and time consuming, and the outcome is unpredictable. In addition, courts outside the U.S. sometimes are less willing than U.S. courts to protect know-how. Misappropriation or unauthorized disclosure of our know-how could impair our competitive position and may have a material adverse effect on our business.

**Risks Related to Commercialization of Our Product Candidates**

***Our future commercial success depends upon attaining significant market acceptance of our product candidates, if approved, among physicians, patients, third-party payors and others in the medical community.***

Even if we obtain marketing approval for GEN-009, GEN-011 or any other products that we may develop or acquire in the future, the product may not gain market acceptance among physicians, third-party payors, patients and others in the medical community. In addition, market acceptance of any approved products depends on a number of other factors, including:

- the efficacy and safety of the product, as demonstrated in clinical trials;
- the clinical indications for which the product is approved, and the label approved by regulatory authorities for use with the product, including any warnings that may be required on the label;
- acceptance by physicians and patients of the product as a safe and effective treatment and the willingness of the target patient population to try new therapies and of physicians to prescribe new therapies;
- the cost, safety and efficacy of treatment in relation to alternative treatments;
- the availability of adequate coverage and reimbursement by third-party payors and government authorities;
- relative convenience and ease of administration;
- the prevalence and severity of adverse side effects;
- the effectiveness of our sales and marketing efforts; and

- the restrictions on the use of our products together with other medications, if any.

Market acceptance is critical to our ability to generate significant revenue. Any product candidate, if approved and commercialized, may be accepted in only limited capacities or not at all. If any approved products are not accepted by the market to the extent that we expect, we may not be able to generate significant revenue and our business would suffer.

***If we are unable to establish sales, marketing and distribution capabilities, we may not be successful in commercializing our product candidates if and when they are approved.***

We do not have a sales or marketing infrastructure and have no experience in the sale, marketing or distribution of pharmaceutical products. To achieve commercial success for any product for which we have obtained marketing approval, we will need to establish a sales and marketing organization.

In the future, we expect to build a focused sales and marketing infrastructure to market or co-promote some of our product candidates in the U.S., if and when they are approved. There are risks involved with establishing our own sales, marketing and distribution capabilities. For example, recruiting and training a sales force is expensive and time consuming and could delay any product launch. If the commercial launch of a product candidate for which we recruit a sales force and establish marketing capabilities is delayed or does not occur for any reason, we would have prematurely or unnecessarily incurred these commercialization expenses. This may be costly, and our investment would be lost if we cannot retain or reposition our sales and marketing personnel.

Factors that may inhibit our efforts to commercialize our products on our own include:

- our inability to recruit, train and retain adequate numbers of effective sales and marketing personnel;
- the inability of sales personnel to obtain access to physicians;
- the lack of adequate numbers of physicians to prescribe any future products;
- the lack of complementary products to be offered by sales personnel, which may put us at a competitive disadvantage relative to companies with more extensive product lines; and
- unforeseen costs and expenses associated with creating an independent sales and marketing organization.

If we are unable to establish our own sales, marketing and distribution capabilities, and instead enter into arrangements with third parties to perform these services, our product revenues and our profitability, if any, are likely to be lower than if we were to market, sell and distribute any products that we develop ourselves. In addition, we may not be successful in entering into arrangements with third parties to sell, market and distribute our product candidates or may be unable to do so on terms that are favorable to us. We likely will have little control over such third parties, and any of them may fail to devote the necessary resources and attention to sell and market our products effectively. If we do not establish sales, marketing and distribution capabilities successfully, either on our own or in collaboration with third parties, we will not be successful in commercializing our product candidates.

***Coverage and reimbursement may be limited or unavailable in certain market segments for our product candidates, which could make it difficult for us to sell our products profitably.***

Market acceptance and sales of any approved products will depend significantly on the availability of adequate coverage and reimbursement from third-party payors and may be affected by existing and future health care reform measures. Third-party payors, such as government health care programs, private health insurers and managed care organizations, decide for which drugs they will provide coverage and establish reimbursement levels. Coverage and reimbursement decisions by a third-party payor may depend upon a number of factors, including the third-party payor's determination that use of a product is:

- a covered benefit under its health plan;
- safe, effective and medically necessary;
- appropriate for the specific patient;
- cost-effective; and
- neither experimental nor investigational.

Third-party payors, whether foreign or domestic, or governmental or commercial, are developing increasingly sophisticated methods of controlling health care costs. Coverage and reimbursement can vary significantly from payor to payor. As a result, obtaining coverage and reimbursement approval for a product from each government and other third-party payor may require us to provide supporting scientific, clinical and cost-effectiveness data for the use of our products to each payor separately, with no assurance that we will be able to provide data sufficient to gain acceptance with respect to coverage and reimbursement. We cannot be sure that coverage or adequate reimbursement will be available for any of our product candidates. Also, we cannot be sure that coverage determinations or reimbursement amounts will not reduce the demand for or require us to lower the price of or provide discounts on, our products. If reimbursement is not available or is available only to limited levels, we may not be able to commercialize certain of our products. In addition, in the U.S., third-party payors are increasingly attempting to contain health care costs by limiting both coverage and the level of reimbursement of new drugs. As a result, significant uncertainty exists as to whether and how much third-party payors will reimburse patients for their use of newly approved drugs, which in turn will put pressure on the pricing of drugs.

***Price controls may be imposed, which may adversely affect our future profitability.***

In international markets, reimbursement and health care payment systems vary significantly by country, and many countries have instituted price ceilings on specific products and therapies. In some countries, particularly member states of the EU, the pricing of prescription pharmaceuticals is subject to governmental control. In these countries, pricing negotiations with governmental authorities can take considerable time after receipt of marketing approval for a product. In addition, there can be considerable pressure by governments and other stakeholders on coverage, prices and reimbursement levels, including as part of cost containment measures. Political, economic and regulatory developments may further complicate pricing negotiations, and pricing negotiations may continue after coverage and reimbursement has been obtained. Reference pricing used by various EU member states and parallel distribution, or arbitrage between low-priced and high-priced member states, can further reduce prices. In some countries, we may be required to conduct a clinical trial or other studies that compare the cost-effectiveness of our product candidates to other available vaccines in order to obtain or maintain coverage, reimbursement or pricing approval. Publication of discounts by third-party payors or authorities may lead to further pressure on the prices or reimbursement levels within the country of publication and other countries. There can be no assurance that our vaccine candidates will be considered cost-effective by third-party payors, that an adequate level of reimbursement will be available or that the third-party payors' reimbursement policies will not adversely affect our ability to sell our products profitably. If reimbursement of our products is unavailable or limited in scope or amount, or if pricing is set at unsatisfactory levels, our business could be adversely affected.

***The impact of health care reform legislation and other changes in the health care industry and in health care spending on us is currently unknown and may adversely affect our business model.***

In the U.S., and in some foreign jurisdictions, the legislative landscape continues to evolve. Our revenue prospects could be affected by changes in health care spending and policy in the U.S. and abroad. We operate in a highly regulated industry and new laws or judicial decisions, or new interpretations of existing laws or decisions, related to health care availability, the method of delivery or payment for health care products and services could negatively impact our business, operations and financial condition. There is significant interest in promoting health care reform, as evidenced by the enactment in the U.S. of the Healthcare Reform Act, as well as by the ongoing efforts to eliminate or significantly modify the Healthcare Reform Act and specific initiatives focused on drug pricing. See "*Business - Government Regulation-Reimbursement*". It is likely that federal and state legislatures within the U.S. as well as foreign governments will continue to consider changes to existing health care legislation.

We cannot predict the ultimate content, timing or effect of any changes to the Healthcare Reform Act or other federal and state reform efforts within the U.S. or abroad. There is no assurance that health care reform will not adversely affect our business and financial results, and we cannot predict how future legislative, judicial or administrative changes relating to healthcare reform will affect our business.

The continuing efforts of the government, insurance companies, managed care organizations and other payors of health care services to contain or reduce costs of health care may adversely affect:

- the demand for any drug products for which we may obtain regulatory approval;
- our ability to set a price that we believe is fair for our products;
- our ability to obtain coverage and reimbursement approval for a product;
- our ability to generate revenues and achieve or maintain profitability; and
- the level of taxes that we are required to pay.

In addition, other broader legislative changes have been adopted that could have an adverse effect upon, and could prevent, our products' or product candidates' commercial success. The Budget Control Act of 2011, as amended ("Budget Control Act"), includes provisions intended to reduce the federal deficit, including reductions in Medicare payments to providers through 2030 (except May 1, 2020 to March 31, 2021). Any significant spending reductions affecting Medicare, Medicaid, or other publicly funded or subsidized health programs, or any significant taxes or fees imposed as part of any broader deficit reduction effort or legislative replacement to the Budget Control Act, or otherwise, could have an adverse impact on our anticipated product revenues.

***We face substantial competition, which may result in others discovering, developing or commercializing products before, or more successfully, than we do.***

The development and commercialization of new drug products is highly competitive. Our future success depends on our ability to demonstrate and maintain a competitive advantage with respect to the design, development and commercialization of our product candidates. Our objective is to design, develop and commercialize new products with superior efficacy, convenience, tolerability and safety. In many cases, the products that we commercialize will compete with existing, market-leading products.

Other companies that are seeking to identify antigens for the development of vaccines and T cell therapies using predictive tools include Achilles Therapeutics Ltd., BioNTech SE, CureVac AG, F. Hoffmann-La Roche AG, Genentech, Inc., Gilead Sciences, Inc., Gritstone Oncology Inc., Iovance Biotherapeutics Inc., Merck & Co., Inc., Moderna Inc., Nouscom AG, PACT Pharma Inc., Vaccibody AS and Ziopharm Oncology Inc.

Many of our potential competitors have significantly greater financial, manufacturing, marketing, drug development, technical and human resources than we do. Large pharmaceutical companies, in particular, have extensive experience in clinical testing, including recruiting patients, obtaining regulatory approvals, and in manufacturing pharmaceutical products. In particular, these companies have greater experience and expertise in securing government contracts and grants to support their research and development efforts, conducting testing and clinical trials, obtaining regulatory approvals to market products, manufacturing such products on a broad scale and marketing approved products. These companies also have significantly greater research and marketing capabilities than we do and may also have products that have been approved or are in late stages of development and have collaborative arrangements in our target markets with leading companies and research institutions. Established pharmaceutical companies may also invest heavily to accelerate discovery and development of novel compounds or to in-license novel compounds that could make the product that we develop obsolete. As a result of all of these factors, our competitors may succeed in obtaining patent protection and/or FDA approval or discovering, developing and commercializing products before we do. In addition, any new product that competes with an approved product must demonstrate compelling advantages in efficacy, convenience, tolerability, and safety to overcome price competition and to be commercially successful. If we are not able to compete effectively against potential competitors, our business will not grow and our financial condition and operations will suffer.

***Our products may cause undesirable side effects or have other properties that delay or prevent their regulatory approval or limit their commercial potential.***

Undesirable side effects caused by our products or even competing products in development that utilize a common mechanism of action could cause us or regulatory authorities to interrupt, delay or halt clinical trials and could result in the denial of regulatory approval by the FDA or other regulatory authorities and potential product liability claims. Serious AEs deemed to be caused by our product candidates could have a material AE on the development of our product candidates and our business as a whole. We do not yet have any information related to whether GEN-009 may cause AEs or serious AEs.

If we or others identify undesirable side effects caused by any of our product candidates either before or after receipt of marketing approval, a number of potentially significant negative consequences could result, including:

- our clinical trials may be put on hold;
- we may be unable to obtain regulatory approval for our vaccine candidates;
- regulatory authorities may withdraw approvals of our vaccines;
- regulatory authorities may require additional warnings on the label;
- a medication guide outlining the risks of such side effects for distribution to patients may be required;
- we could be sued and held liable for harm caused to patients; and
- our reputation may suffer.

Any of these events could prevent us from achieving or maintaining market acceptance of our products and could substantially increase commercialization costs.

**Risks Related to Our Indebtedness**

***Our level of indebtedness and debt service obligations could adversely affect our financial condition and may make it more difficult for us to fund our operations.***

On February 18, 2021 (the "2021 Loan Closing Date"), we entered into a Loan and Security Agreement with Silicon Valley Bank ("SVB") for a $10 million secured term loan (the "2021 Term Loan"). $9.0 million of the proceeds from the 2021 Term Loan were used to repay the borrowings that were outstanding at the 2021 Loan Closing Date under our previous loan and security agreement with Hercules Capital, Inc. ("Hercules"), paying off all obligations owing under, and terminating, the previous loan and security agreement with Hercules on February 18, 2021. The remaining proceeds from the 2021 Term Loan of $1.0 million were received by us for working capital and general corporate purposes.

This indebtedness may create additional financing risk for us, particularly if our business or prevailing financial market conditions are not conducive to paying off or refinancing our outstanding debt obligations at maturity or in the event of an acceleration of the 2021 Term Loan. This indebtedness could also have important negative consequences, including the fact that:

- we will need to repay our indebtedness by making payments of interest and principal, which will reduce the amount of money available to finance our operations, our research and development efforts and other general corporate activities; and
- our failure to comply with the covenants in the 2021 Term Loan could result in an event of default that, if not cured or waived, could accelerate our obligation to repay this indebtedness, and SVB could seek to enforce its security interest in the assets securing such indebtedness.

***We may not have cash available to us in an amount sufficient to enable us to make interest or principal payments on our indebtedness when due. If we do not make scheduled payments when due, or otherwise experience an event of default under the 2021 Term Loan, SVB could accelerate our total loan obligation or enforce its security interest against us.***

Failure to satisfy our current and future debt obligations under the 2021 Term Loan could result in an event of default. In addition, other events, including certain events that are not entirely in our control, such as the occurrence of a material adverse event on our business, could cause an event of default to occur. As a result of the occurrence of an event of default, SVB could accelerate all of the amounts due under the 2021 Term Loan. In the event of such an acceleration, we may not have sufficient funds or may be unable to arrange for additional financing to repay our indebtedness. In addition, all obligations under the 2021 Term Loan are secured by substantially all of our property, excluding our intellectual property (but including proceeds from our intellectual property). SVB could seek to enforce its security interests in the assets securing such indebtedness. If we are unable to pay amounts due to SVB upon acceleration of the 2021 Term Loan or if SVB enforces its security interest against our assets securing our indebtedness to SVB, our ability to continue to operate our business may be jeopardized.

***We are subject to certain restrictive covenants which, if breached, could result in the acceleration of our debt under the 2021 Term Loan and have a material adverse effect on our business and prospects.***

The 2021 Term Loan imposes operating and other restrictions on us. Such restrictions will affect, and in many respects limit or prohibit, our ability and the ability of any future subsidiary to, among other things:

- dispose of certain assets;
- change our lines of business;
- engage in mergers or consolidations;
- make investments;
- incur additional indebtedness;
- create liens on assets;
- pay dividends and make distributions or repurchase our capital stock; and
- engage in certain transactions with affiliates.

These restrictive covenants may prevent us from undertaking an action that we believe is in our best interests. In addition, if we were to breach any of these restrictive covenants, SVB could accelerate our indebtedness under the 2021 Term Loan or enforce its security interest against our assets, either of which could have a material adverse effect on our ability to continue operating.

**Risks Related to Our Business and Industry**

***If we fail to attract and keep senior management and key scientific personnel, we may be unable to successfully develop our products, conduct our clinical trials and commercialize our product candidates.***

We are highly dependent on members of our senior management, including William Clark, our President and Chief Executive Officer, Tom Davis, M.D., our Chief Medical Officer, and Jessica Flechtner, Ph.D., our Chief Scientific Officer. The loss of the services of any of these persons could impede the achievement of our research, development and commercialization objectives. We have employment agreements with each of these members of senior management.

Recruiting and retaining qualified scientific, clinical, manufacturing, sales and marketing personnel will also be critical to our success. The loss of the services of our executive officers or other key employees could impede the achievement of our research, development and commercialization objectives and seriously harm our ability to successfully implement our business strategy. Furthermore, replacing executive officers and key employees may be difficult and may take an extended period of time because of the limited number of individuals in our industry with the breadth of skills and experience required to successfully develop, gain regulatory approval of and commercialize products. Competition to hire from this limited pool is intense, and we may be unable to hire, train, retain or motivate these key personnel on acceptable terms, based on the status of our clinical development programs and 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 strategy. 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. If we are unable to continue to attract and retain high quality personnel, our ability to pursue our growth strategy will be limited.

***Our employees, independent contractors, principal investigators, consultants, commercial partners, and vendors may engage in misconduct or other improper activities, including noncompliance with regulatory standards and requirements and insider trading.***

We are exposed to the risk of fraudulent or other illegal activity by our employees, independent contractors, principal investigators, consultants, commercial partners, and vendors. Misconduct by these parties could include intentional, reckless and/or negligent conduct that fails: to comply with the laws of the FDA and similar foreign regulatory bodies; to provide true, complete and accurate information to the FDA and similar foreign regulatory bodies; to comply with manufacturing standards we have established; to comply with federal, state and foreign health care fraud and abuse laws and regulations; to report financial information or data accurately; or to disclose unauthorized activities to us. In particular, the promotion, sale and marketing of health care items and services, as well as certain business arrangements in the health care industry are subject to extensive laws and regulations intended to prevent misconduct, including fraud, kickbacks, self-dealing and other abusive practices. These laws and regulations may restrict or prohibit a wide range of pricing, discounting, marketing, structuring and commission(s), certain customer incentive programs and other business arrangements. Activities subject to these laws also involve the improper use of information obtained in the course of patient recruitment for clinical trials. It is not always possible to identify and deter such misconduct, and the precautions we take to detect and prevent this activity may not be effective in controlling unknown or unmanaged risks or losses or in protecting us from governmental investigations or other actions or lawsuits stemming from a failure to be in compliance with such laws or regulations. If any such actions are instituted against us, and we are not successful in defending ourselves or asserting our rights, those actions could have a significant impact on our business, including the imposition of civil, criminal and administrative penalties, damages, monetary fines, disgorgement, possible exclusion from participation in Medicare, Medicaid and other federal health care programs, 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.

***We may encounter difficulties in managing our growth and expanding our operations successfully.***

As we seek to advance our product candidates through clinical trials and commercialization, we will need to expand our development, regulatory, manufacturing, marketing and sales capabilities or contract with third parties to provide these capabilities for us. As our operations expand, we expect that we will need to manage additional relationships with various strategic partners, suppliers and other third parties. Future growth will impose significant added responsibilities on members of management. Our future financial performance and our ability to commercialize our product candidates and to compete effectively will depend, in part, on our ability to manage any future growth effectively. To that end, we must be able to manage our development efforts and clinical trials effectively and hire, train and integrate additional management, administrative and, if necessary, sales and marketing personnel. We may not be able to accomplish these tasks, and our failure to accomplish any of them could prevent us from successfully growing our company.

***If product liability lawsuits are brought against us, we may incur substantial liabilities and may be required to limit commercialization of our product candidates.***

We face an inherent risk of product liability as a result of the clinical testing of our product candidates and will face an even greater risk if we commercialize any products. For example, we may be sued if any product we develop allegedly causes injury or is found to be otherwise unsuitable during product testing, manufacturing, marketing or sale. Any such product liability claims may include allegations of defects in manufacturing, defects in design, a failure to warn of dangers inherent in the product, negligence, strict liability and a breach of warranties. Claims could also be asserted under state consumer protection acts. If we cannot successfully defend ourselves against product liability claims, we may incur substantial liabilities or be required to limit commercialization of our product candidates. Even a successful defense would require significant financial and management resources. Regardless of the merits or eventual outcome, liability claims may result in:

- decreased demand for any product candidates or products that we may develop;
- injury to our reputation and significant negative media attention;
- withdrawal of clinical trial participants;
- significant costs to defend the related litigations;
- a diversion of management's time and our resources;
- substantial monetary awards to trial participants or patients;
- product recalls, withdrawals, or labeling, marketing or promotional restrictions;
- loss of revenue;
- the inability to commercialize any product candidates that we may develop; and
- a decline in our stock price.

Failure to obtain and retain sufficient product liability insurance at an acceptable cost to protect against potential product liability claims could prevent or inhibit the commercialization of products we develop. We currently carry product liability insurance covering our clinical trials in the amount of $5.0 million in the aggregate. Although we maintain product liability insurance, any claim that may be brought against us could result in a court judgment or settlement in an amount that is not covered, in whole or in part, by our insurance or that is in excess of the limits of our insurance coverage. Our insurance policies also have various exclusions, and we may be subject to a product liability claim for which we have no coverage. We will have to pay any amounts awarded by a court or negotiated in a settlement that exceed our coverage limitations or that are not covered by our insurance, and we may not have, or be able to obtain, sufficient capital to pay such amounts.

***We must comply with environmental laws and regulations, and failure to comply with these laws and regulations could expose us to significant liabilities.***

We use hazardous chemicals and radioactive and biological materials in certain aspects of our business and are subject to a variety of federal, state and local laws and regulations governing the use, generation, manufacture, distribution, storage, handling, treatment and disposal of these materials. We cannot eliminate the risk of accidental injury or contamination from the use, manufacture, distribution, storage, handling, treatment or disposal of hazardous materials. In the event of contamination or injury, or failure to comply with environmental, occupational health and safety and export control laws and regulations, we could be held liable for any resulting damages and any such liability could exceed our assets and resources. We are uninsured for third-party contamination injury.

***Our failure to comply with data protection laws and regulations could lead to government enforcement actions, private litigation and/or adverse publicity and could negatively affect our operating results and business.***

We are subject to data protection laws and regulations that address privacy and data security. The legislative and regulatory landscape for data protection continues to evolve, and in recent years there has been an increasing focus on privacy and data security issues. In the U.S., numerous federal and state laws and regulations, including state data breach notification laws, state health information privacy laws and federal and state consumer protection laws govern the collection, use, disclosure and protection of health-related and other personal information. Failure to comply with data protection laws and regulations could result in government enforcement actions, which could include civil or criminal penalties, private litigation and/or adverse publicity and could negatively affect our operating results and business. In addition, we may obtain health information from third parties (e.g., healthcare providers who prescribe our products) that are subject to privacy and security requirements under the Health Insurance Portability and Accountability Act of 1996, as amended by the Health Information Technology for Economic and Clinical Health Act (collectively, "HIPAA"). While we have determined that we are neither a "covered entity" nor "business associate" directly subject to HIPAA, we have assumed contractual obligations related to protecting the privacy of personal information obtained from such sources. As HIPAA's criminal provisions may also apply to entities other than "covered entities" or "business associates" in certain circumstances, we could be subject to legal action or criminal penalties if we knowingly obtain or disclose individually identifiable health information from a HIPAA-covered entity in a manner that is not authorized or permitted.

The collection and use of personal health data in the European Economic Area ("EEA") is governed by the provisions of the General Data Protection Regulation ("GDPR") which came into effect in May 2018. This regulation imposes several requirements relating to the consent of the individuals to whom the personal data relates, the information provided to the individuals, notification of data processing obligations to the competent national data protection authorities and the security and confidentiality of the personal data. The GDPR also imposes strict rules on the transfer of personal data out of the EEA (including from clinical trial sites in the EEA) to the U.S. In July 2020, the Court of Justice of the European Union invalidated the EU-U.S. Privacy Shield framework, one of the mechanisms used to legitimize the transfer of personal data from the EEA to the U.S., which has led to increased scrutiny on data transfers from the EEA to the United States generally and may increase our costs of compliance with data privacy legislation. Failure to comply with the requirements of the GDPR and related national data protection laws may result in significant fines and other administrative penalties. In the U.S., several state legislatures are considering enacting new data privacy legislation. One example of such legislation that has already been passed is the California Consumer Privacy Act ("CCPA"), which took effect on January 1, 2020. The CCPA gives California consumers (defined to include all California residents) certain rights, including the right to receive certain details regarding the processing of their data by covered companies, the right to request deletion of their data, and the right to opt out of sales of their data. The CCPA additionally imposes several obligations on covered companies to provide notice to California consumers regarding their data processing activities. The CCPA provides for imposition of substantial fines on companies that violate the law and also confers a private right of action on data subjects to seek statutory or actual damages for breaches of their personal information.

***A pandemic, epidemic or outbreak of an infectious disease, such as the novel coronavirus, or COVID-19, has and may in the future adversely affect our business.***

An outbreak of COVID-19 occurred in China in December 2019 and has spread around the world. The Center for Disease Control ("CDC") has recognized this outbreak as a pandemic, which has caused shutdowns to businesses and cities worldwide while disrupting supply chains, business operations, travel, consumer confidence, and business sentiment. The situation is ever evolving and its effects both short-term and long-term remain unknown. The spread of COVID-19 has resulted in certain disruptions to our business and may result in future additional disruptions to our business. Examples of both include without limitation the following:

- The health and well-being of our employees and suppliers is at risk. If a critical threshold of our personnel, or the personnel of our suppliers, were to be diagnosed with COVID-19, placed in quarantine due to potential exposure to COVID-19, or need to care for family members diagnosed with COVID-19, it may result in significant manufacturing and business disruption.
- Our clinical sites may experience delays in the enrollment of new patients, which could have a material impact on our GEN-011 program.
- We have asked most employees who are not directly involved in our GEN-009 and GEN-011 clinical programs to work from home, which could impact our ability to effectively plan, execute, communicate and maintain our corporate culture. The increase in working remotely could increase our cyber security risk, create data accessibility concerns, and make us more susceptible to communication disruptions, any of which could adversely impact our business operations.

- The possibility that certain country borders may close or significantly reduce cross-border traffic in response to COVID-19, which could affect certain of our manufacturers' and suppliers' ability to provide product and supplies to us on a timely basis.

The full extent to which COVID-19 impacts our business will depend on future developments, which are highly uncertain and cannot be predicted, including new information which may emerge concerning the severity of COVID-19 and the actions to treat or contain COVID-19 or to otherwise limit its impact, among others.

***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, cleared or approved, or commercialized in a timely manner or at all, which could negatively impact our business.***

The ability of the FDA to review and clear or 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 ability to hire and retain key personnel and accept the payment of user fees, and other events that may otherwise affect the FDA's ability to perform routine functions. Average review times at the agency 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 may also slow the time necessary for marketing applications, clinical trial authorizations or other regulatory submissions to drug candidates to be reviewed and/or approved by necessary government agencies, which would adversely affect our business. For example, over the last several years, including for 35 days beginning on December 22, 2018, the U.S. government has shut down several times and certain regulatory agencies, such as the FDA, have had to furlough critical employees and stop critical activities.

Separately, in response to the global pandemic of COVID-19, on March 10, 2020, the FDA announced its intention to postpone most foreign inspections of manufacturing facilities and products through April 2020, and subsequently, on March 18, 2020, the FDA announced its intention to temporarily postpone routine surveillance inspections of domestic manufacturing facilities. In July 2020, the FDA announced it was seeking to resume prioritized inspections of domestic manufacturing facilities as well as "mission-critical" inspections of foreign and domestic manufacturing facilities. However, in December 2020, FDA announced that due to continued travel restrictions, limited access to facilities and health risks to inspectors, it was having difficulty in conducting facility assessments that are necessary before it can make a decision on a marketing application. As a result, FDA acknowledged that review timelines in some cases would be delayed. Regulatory authorities outside the U.S. may adopt similar restrictions or other policy measures in response to the COVID-19 pandemic. 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 marketing applications, clinical trial authorizations, or other regulatory submissions, which could have a material adverse effect on our business.

**Risks Related to Our Common Stock**

***Our largest stockholder, New Enterprise Associates ("NEA"), could exert significant influence over us and could limit other stockholders' ability to influence the outcome of key transactions, including any change of control.***

Our largest stockholder, NEA, beneficially owns, in the aggregate, shares representing approximately 26% of our outstanding common stock as of February 18, 2021. In addition, one member of our board of directors is associated with NEA. As a result, we expect that NEA will be able to exert significant influence over our business. NEA may have interests that differ from other stockholders' interests, and it may vote in a way with which other stockholders disagree and that may be adverse to other stockholders' interests. The concentration of ownership of our capital stock may have the effect of delaying, preventing or deterring a change of control of our company, could deprive our stockholders of an opportunity to receive a premium for their common stock as part of a sale of our company and may adversely affect the market price of our common stock.

***If our stock price is volatile, our stockholders could incur substantial losses and we may become involved in securities-related litigation, including securities class action litigation, that could divert management's attention and harm our business and subject us to significant liabilities.***

Our stock price is likely to be volatile. The stock market in general and the market for biopharmaceutical companies in particular have experienced extreme volatility that has often been unrelated to the operating performance of particular companies. As a result of this volatility, our stockholders could incur substantial losses. The market price for our common stock may be influenced by many factors, including:

- the success of competitive products or technologies;
- results of clinical trials of our product candidates;
- the timing of the release of results of our clinical trials;

- results of clinical trials of our competitors' products;
- regulatory actions or legal developments with respect to our products or our competitors' products;
- developments or disputes concerning patent applications, issued patents or other proprietary rights;
- the results of our efforts to discover, develop, acquire or in-license additional product candidates or products;
- actual or anticipated fluctuations in our financial condition and operating results;
- publication of research reports by securities analysts about us or our competitors or our industry;
- our failure or the failure of our competitors to meet analysts' projections or guidance that we or our competitors may give to the market;
- additions and departures of key personnel;
- strategic decisions by us or our competitors, such as acquisitions, divestitures, spin-offs, joint ventures, strategic investments or changes in business strategy;
- the passage of legislation or other regulatory developments affecting us or our industry;
- fluctuations in the valuation of companies perceived by investors to be comparable to us;
- sales of our common stock by us, our insiders or our other stockholders;
- speculation in the press or investment community;
- announcement or expectation of additional financing efforts;
- changes in accounting principles;
- terrorist acts, acts of war or periods of widespread civil unrest;
- natural disasters and other calamities;
- changes in market conditions for biopharmaceutical stocks; and
- changes in general market and economic conditions.

In addition, the stock market has recently experienced significant volatility, particularly with respect to pharmaceutical, biotechnology and other life sciences company stocks. The volatility of pharmaceutical, biotechnology and other life sciences company stocks often does not relate to the operating performance of the companies represented by the stock. As we operate in a single industry, we are especially vulnerable to these factors to the extent that they affect our industry or our products, or to a lesser extent our markets.

Further, any future lawsuits or litigation could result in substantial costs and divert our management's attention and resources and could also require us to make substantial payments to satisfy judgments or to settle litigation.

***Failure to comply with The Nasdaq Capital Market continued listing requirements may result in our common stock being delisted from The Nasdaq Capital Market.***

If our stock price falls below $1.00 per share, we may not continue to qualify for continued listing on The Nasdaq Capital Market or The Nasdaq Global Market. To maintain listing, we are required, among other things, to maintain a minimum closing bid price of $1.00 per share. If the closing bid price of our common stock is below $1.00 per share for 30 consecutive business days, we will receive a deficiency notice from Nasdaq advising us that we have a certain period of time, typically 180 days, to regain compliance by maintaining a minimum closing bid price of at least $1.00 for at least ten consecutive business days, although Nasdaq could require a longer period.

On June 15, 2018, we received a written notification from Nasdaq's Listing Qualifications Department that we had failed to comply with Nasdaq Listing Rule 5450(a)(1) because the bid price for our common stock over a period of 30 consecutive business days prior to such date had closed below the minimum $1.00 per share requirement for continued listing. In accordance with Nasdaq Listing Rule 5810(c)(3)(A), we were afforded an initial period of 180 calendar days, or until December 12, 2018, to regain compliance with Rule 5450(a)(1). We determined that we would not be in compliance with Rule 5450(a)(1) by December 12, 2018, and on November 19, 2018, submitted an application to transfer our common stock from listing on the Nasdaq Global Market to the Nasdaq Capital Market. Doing so allowed us to become eligible for an additional 180 day compliance period provided for companies listed on the Nasdaq Capital Market, provided that we met the continued listing requirements for market value of publicly held shares and all other initial listing standards for the Nasdaq Capital Market, with the exception of the minimum bid price requirement, and provided written notice of our intention to cure the deficiency during the second compliance period by effecting a reverse stock split, if necessary. In accordance with the original notification, we indicated in our transfer application that we met all of the other continuing listing requirements for the Nasdaq Capital Market, with the exception of the bid price requirement, and provided written notice of our intention to cure the deficiency during the second compliance period by effecting a reverse stock split, if necessary. On December 13, 2018, we received notice from Nasdaq that we were granted an additional 180 calendar days, or until June 11, 2019, to regain compliance with the minimum $1.00 bid price per share requirement of the Nasdaq listing rules. Accordingly, at the opening of business on December 17, 2018, the listing of the shares of our common stock was transferred from the Nasdaq Global Market to the Nasdaq Capital Market. Our common stock continues to trade under the symbol "GNCA."

On May 22, 2019, we effected a reverse stock split of our issued and outstanding common stock, par value $0.001, at a ratio of one-for-eight. As such, prior to June 10, 2019 the bid price of our common stock closed at or above $1.00 per share for a minimum of 10 consecutive business days, and Nasdaq provided written notice that we achieved compliance with the Nasdaq listing rules. Even though we did regain compliance with minimum closing bid price of $1.00 per share by June 10, 2019, there is no guarantee that we will remain in compliance thereafter. The delisting of our common stock would significantly affect the ability of investors to trade our common stock and negatively impact the liquidity and price of our common stock. In addition, the delisting of our common stock could materially adversely impact our ability to raise capital on acceptable terms or at all. Delisting from Nasdaq could also have other negative results, including the potential loss of confidence by our current or prospective third-party providers and collaboration partners, the loss of institutional investor interest, and fewer licensing and partnering opportunities.

***Our failure to implement and maintain effective internal control over financial reporting could result in material misstatements in our financial statements which could require us to restate financial statements, cause investors to lose confidence in our reported financial information and have a negative effect on our stock price.***

We cannot provide assurance that any material weaknesses or significant deficiencies in our internal control over financial reporting will not be identified in the future. Any failure to maintain or implement required new or improved controls, or any difficulties we encounter in their implementation, could result in additional material weaknesses or significant deficiencies, cause us to fail to meet our periodic reporting obligations or result in material misstatements in our financial statements. Any such failure could also adversely affect the results of periodic management evaluations regarding the effectiveness of our internal control over financial reporting. The existence of a material weakness or significant deficiency could result in errors in our financial statements that could result in a restatement of financial statements, cause us to fail to meet our reporting obligations and cause investors to lose confidence in our reported financial information, leading to a decline in our stock price.

***We incur significant costs as a result of being a public company and our management expects to devote substantial time to public company compliance programs.***

As a public company, we incur significant legal, insurance, accounting and other expenses. In addition, our administrative staff are required to perform additional tasks. We invest resources to comply with evolving laws, regulations and standards, and this investment could result in increased general and administrative expenses and may divert management’s time and attention from product development activities. If our efforts to comply with new laws, regulations and standards differ from the activities intended by regulatory or governing bodies due to ambiguities related to practice, regulatory authorities may initiate legal proceedings against us and our business may be harmed. Due to the recent changes in the shareholder class action landscape, director and officer liability insurance has been more expensive. If this trend continues we may be required to accept reduced coverage or incur substantially higher costs to obtain coverage. These factors could also make it more difficult for us to attract and retain qualified members of our board of directors, particularly to serve on our audit committee and compensation committee, and qualified executive officers.

The Sarbanes-Oxley Act requires that we maintain effective disclosure controls and procedures and internal control over financial reporting. Any failure to develop or maintain effective controls could adversely affect the results of periodic management evaluations. In the event that we are not able to demonstrate compliance with the Sarbanes-Oxley Act, that our internal control over financial reporting is perceived as inadequate, or that we are unable to produce timely or accurate financial statements, investors may lose confidence in our operating results and the price of our ordinary shares could decline. In addition, if we are unable to continue to meet these requirements, we may not be able to remain listed on Nasdaq.

We are required to comply with certain of the SEC's rules that implement Section 404 of the Sarbanes-Oxley Act, which require management to certify financial and other information in our quarterly and annual reports and provide an annual management report on the effectiveness of our internal control over financial reporting. This assessment must include the disclosure of any material weaknesses in our internal control over financial reporting identified by our management or our independent registered public accounting firm. To achieve compliance with Section 404 within the prescribed period, we engage in a process to document and evaluate our internal control over financial reporting, which is both costly and challenging. In this regard, we will need to continue to dedicate internal resources, potentially engage outside consultants and adopt a detailed work plan to assess and document the adequacy of internal control over financial reporting, continue steps to improve control processes as appropriate, validate through testing that controls are functioning as documented and implement a continuous reporting and improvement process for internal control over financial reporting. Despite our efforts, there is a risk that we will not be able to conclude, within the prescribed timeframe or at all, that our internal control over financial reporting is effective as required by Section 404. If we identify one or more material weaknesses, it could result in an adverse reaction in the financial markets due to a loss of confidence in the reliability of our financial statement.

***Provisions in our charter documents and under Delaware law have anti-takeover effects that could discourage an acquisition of us by others, even if an acquisition would be beneficial to our stockholders and prevent attempts by our stockholders to replace or remove our current management.***

Provisions in our amended and restated certificate of incorporation and amended and restated by-laws contain provisions that may have the effect of discouraging, delaying or preventing a change in control of us or changes in our management. 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:

- authorize "blank check" preferred stock, which could be issued by our board of directors without stockholder approval and may contain voting, liquidation, dividend and other rights superior to our common stock;
- create a classified board of directors whose members serve staggered three-year terms;
- specify that special meetings of our stockholders can be called only by our board of directors, the chairperson of our board of directors, our chief executive officer or our president;
- prohibit stockholder action by written consent;
- establish an advance notice procedure for stockholder approvals to be brought before an annual meeting of our stockholders, including proposed nominations of persons for election to our board of directors;
- provide that our directors may be removed only for cause;
- provide that vacancies on our board of directors may be filled only by a majority of directors then in office, even though less than a quorum;
- specify that no stockholder is permitted to cumulate votes at any election of directors;
- expressly authorize our board of directors to modify, alter or repeal our by-laws; and
- require supermajority votes of the holders of our common stock to amend specified provisions of our by-laws.

These provisions, alone or together, could delay or prevent hostile takeovers and changes in control or changes in our management.

Moreover, because we are incorporated in Delaware, we are governed by the provisions of Section 203 of the Delaware General Corporation Law, 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.

Any provision of our amended and restated certificate of incorporation, our amended and restated by-laws or Delaware law that has the effect of delaying or deterring a change in control could limit the opportunity for our stockholders to receive a premium for their shares of our common stock and could also affect the price that some investors are willing to pay for our common stock.

***Our amended and restated certificate of incorporation designates the state or federal courts located in the State of Delaware as the sole and exclusive forum for certain types of actions and proceedings that may be initiated by 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, subject to limited exceptions, the state and federal courts located in 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 owed by any of our directors, officers or other employees to us or our stockholders, (3) any action asserting a claim against us arising pursuant to any provision of the Delaware General Corporation Law, our amended and restated certificate of incorporation or our amended and restated by-laws or (4) any other action asserting a claim against us that is governed by the internal affairs doctrine. Any person or entity purchasing or otherwise acquiring any interest in shares of our capital stock shall be deemed to have notice of and to have consented to the provisions of our amended and restated certificate of incorporation described above. This choice of forum provision 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 employees. Alternatively, if a court were to find these provisions of our amended and restated certificate of incorporation inapplicable to, or unenforceable in respect of, one or more of the specified types of actions or proceedings, we may incur additional costs associated with resolving such matters in other jurisdictions, which could adversely affect our business and financial condition.

***Because we do not anticipate paying any cash dividends on our capital stock in the foreseeable future, capital appreciation, if any, will be the source of gain for our stockholders.***

Investors should not rely on an investment in our common stock to provide dividend income. We do not anticipate that we will pay any cash dividends to holders of our common stock in the foreseeable future. Instead, we plan to retain any earnings to maintain and expand our operations. In addition, our ability to pay cash dividends is currently restricted by the terms of our debt financing arrangement, and any future debt financing arrangement may contain terms prohibiting or limiting the amount of dividends that may be declared or paid on our common stock. Accordingly, investors must rely on sales of their common stock after price appreciation, which may never occur, as the only way to realize any return on their investment. As a result, investors seeking cash dividends should not purchase our common stock.

**General Risk Factors**

***Significant disruptions of information technology systems or security breaches could adversely affect our business.***

We are increasingly dependent upon information technology systems, infrastructure and data to operate our business. In the ordinary course of business, we collect, store and transmit large amounts of confidential information (including, among other things, trade secrets or other intellectual property, proprietary business information and personal information). It is critical that we do so in a secure manner to maintain the confidentiality and integrity of such confidential information. We also have outsourced elements of our operations to third parties, and as a result we manage a number of third-party vendors who may or could have access to our confidential information. The size and complexity of our information technology systems, and those of third-party vendors with whom we contract, and the large amounts of confidential information stored on those systems, make such systems vulnerable to service interruptions or to security breaches from inadvertent or intentional actions by our employees, consultants, third-party vendors, and/or business partners, or from cyber-attacks by malicious third parties. Cyber-attacks are increasing in their frequency, sophistication and intensity, and have become increasingly difficult to detect. Cyber-attacks could include the deployment of harmful malware, ransomware, denial-of-service attacks, social engineering and other means to affect service reliability and threaten the confidentiality, integrity and availability of information. Cyber-attacks could also include phishing attempts or e-mail fraud to cause payments or information to be transmitted to an unintended recipient.

Significant disruptions of our information technology systems, or those of our third-party vendors, or security breaches could adversely affect our business operations and/or result in the loss, misappropriation and/or unauthorized access, use or disclosure of, or the prevention of access to, confidential information, including, among other things, trade secrets or other intellectual property, proprietary business information and personal information, and could result in financial, legal, business and reputational harm to us. For example, any such event that leads to unauthorized access, use or disclosure of personal information, including personal information regarding our patients or employees, could harm our reputation, require us to comply with federal and/or state breach notification laws and foreign law equivalents, and otherwise subject us to liability under laws and regulations that protect the privacy and security of personal information. Security breaches and other inappropriate access can be difficult to detect, and any delay in identifying them may lead to increased harm of the type described above. While we have implemented security measures to protect our information technology systems and infrastructure, there can be no assurance that such measures will prevent service interruptions or security breaches that could adversely affect our business.

***We cannot predict what the market price of our common stock will be and, as a result, it may be difficult for our stockholders to sell their shares of our common stock.***

An inactive market may impair our ability to raise capital by selling shares of our common stock and may impair our ability to enter into strategic partnerships or acquire companies or products by using our shares of common stock as consideration. We cannot predict the prices at which our common stock will trade. It is possible that in one or more future periods our results of operations may be below the expectations of public market analysts and investors and, as a result of these and other factors, the price of our common stock may fall.

## Item 1B. Unresolved Staff Comments

None.

## Item 2. Properties

Our principal executive office is located at 100 Acorn Park Drive, 5th floor, Cambridge, Massachusetts 02140. We have two leases at this address, and in aggregate, we occupy 46,000 square feet of laboratory and office space. We believe that our existing facilities are sufficient for our present operations, but that in the near future our existing facility space will need to be expanded to meet the demands of our future lab operations or we will have to move into a new facility.

## Item 3. Legal Proceedings

In the ordinary course of business, we are from time to time involved in lawsuits, claims, investigations, proceedings, and threats of litigation relating to intellectual property, commercial arrangements and other matters. We do not believe we are currently party to any pending legal action, arbitration proceeding or governmental proceeding, the outcome of which, if determined adversely to us, would individually or in the aggregate be reasonably expected to have a material adverse effect on our business or operating results. We are not a party to any material proceedings in which any director, member of senior management or affiliate of ours is either a party adverse to us or our subsidiaries or has a material interest adverse to us or our subsidiaries.

## Item 4. Mine Safety Disclosures

Not applicable.

## PART II

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

**Market Information**

Our common stock has been publicly traded on The Nasdaq Capital Market under the symbol "GNCA" since December 17, 2018. Prior to that, our common stock had been publicly traded on The Nasdaq Global Market since February 5, 2014.

**Holders**

As of February 18, 2021, there were approximately 16 holders of record of our common stock. This number does not include beneficial owners whose shares are held by nominees in street name.

**Dividends**

We have never declared or paid cash dividends on our common stock, and we do not expect to pay any cash dividends on our common stock in the foreseeable future.

**Purchase of Equity Securities**

We did not purchase any of our registered equity securities during the period covered by this Annual Report on Form 10-K.

**Securities Authorized for Issuance under Equity Compensation Plans**

The following table contains information about our equity compensation plans as of December 31, 2020.

| Plan category | (a) Number of securities to be issued upon exercise of outstanding options, warrants and rights | (b) Weighted-average exercise price of outstanding options, warrants and rights[2] | (c) Number of securities remaining available for future issuance under equity compensation plans (excluding securities reflected in column (a))[3] |
|---|---|---|---|
| Equity compensation plans approved by security holders[1] | 2,879,056 | $ 7.05 | 2,581,917 |

(1) Includes information regarding our Amended and Restated 2014 Equity Incentive Plan.

(2) The weighted-average exercise price includes all outstanding stock options but does not include restricted stock units, which do not have an exercise price.

(3) Does not include 2,120,753 shares added to the Amended and Restated 2014 Equity Incentive Plan under the evergreen provision on January 1, 2021.

## Item 6. Selected Financial Data

Not applicable.

## 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 together with our financial statements and related notes appearing 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 and related financing, includes forward-looking statements that involve risks and uncertainties. As a result of many factors, including those factors set forth in the "Risk Factors" section of this Annual Report on Form 10-K, our actual results could differ materially from the results described in or implied by the forward-looking statements contained in the following discussion and analysis.*

### Overview

We are a biopharmaceutical company dedicated to discovering and developing novel cancer immunotherapies using our proprietary ATLAS™ platform. The ATLAS platform profiles each patient's $CD4^+$ and $CD8^+$ T cell immune responses to every potential target or "antigen" identified by next-generation sequencing of that patient's tumor. ATLAS zeroes in on both antigens that activate anti-tumor T cell responses and inhibitory antigens, Inhibigens™, that drive pro-tumor immune responses. We believe this approach ensures that cancer immunotherapies, such as vaccines and cellular therapies, focus T cell responses on the tumor targets most vulnerable to T cell targeting. Consequently, we believe that ATLAS may enable more immunogenic and efficacious cancer immunotherapies.

Our GEN-011 program is an adoptive T cell therapy using neoantigen-targeted peripheral cells ("NPTs"). The GEN-011 NPTs are specific for ATLAS identified anti-tumor antigens that are used to manufacture peripheral blood-derived, tumor-specific T cell therapy. GEN-011's use of peripheral blood brings potential patient accessibility and cost advantages by eliminating the need for extra surgery or viable tumor. We are initiating clinical sites and accruing patients for a first-in-human GEN-011 clinical trial. Our GEN-009 program is a neoantigen vaccine delivering adjuvanted synthetic long peptides spanning ATLAS-identified anti-tumor neoantigens. After reporting initial clinical responses for GEN-009 delivered in combination with standard-of-care checkpoint inhibitors ("CPIs") in 2020, we continue to monitor patients to further evaluate these initial efficacy signals.

***Financing and business operations***

We commenced business operations in August 2006. To date, our operations have been limited to organizing and staffing our company, acquiring and developing our proprietary ATLAS technology, identifying potential product candidates, and undertaking preclinical studies and clinical trials for our product candidates. We have not generated any product revenue and do not expect to do so for the foreseeable future. Our revenues for 2020 were from the material transfer agreement ("MTA") with a strategic partner, Shionogi & Co. Ltd ("Shionogi"). See **Note 3. Revenue** within the notes to the consolidated financial statements in this Annual Report on Form 10-K. We have financed our operations primarily through the issuance of our equity securities and through debt financings. As of December 31, 2020, we had received an aggregate of $443.3 million in net proceeds from the issuance of equity securities, we had outstanding borrowings of $13.9 million, and our cash and cash equivalents were $79.8 million.

Since inception, we have incurred significant operating losses. We expect to incur significant expenses and increasing operating losses for the foreseeable future. Our net losses may fluctuate significantly from quarter-to-quarter and year-to-year. We will need to generate significant revenue to achieve profitability, and we may never do so.

On February 18, 2021, we entered into a Loan and Security Agreement with SVB for a $10 million secured term loan. $9.0 million of the proceeds from the 2021 Term Loan were used to repay the borrowings that were outstanding at the 2021 Loan Closing Date under our previous loan and security agreement with Hercules, paying off all obligations owing under, and terminating, the previous loan and security agreement with Hercules on February 18, 2021. The remaining proceeds from the 2021 Term Loan of $1.0 million were received by us for working capital and general corporate purposes.

In July 2020, we completed a private placement (the "2020 Private Placement") in which we received net cash proceeds of $74.5 million and issued approximately 21.4 million shares of our common stock, pre-funded warrants to purchase approximately 12.2 million shares of our common stock, and warrants to purchase approximately 33.6 million shares of our common stock. We incurred $5.4 million of offering-related expenses for the 2020 Private Placement.

In 2020, we sold approximately 2.4 million shares under our ATM program and received net proceeds of $5.8 million, after deducting commissions. In 2019, we sold no shares under the ATM program. As of December 31, 2020, we had $39.9 million in gross proceeds remaining under the ATM.

In October 2019, we entered into a purchase agreement with Lincoln Park Capital ("LPC") pursuant to which LPC purchased $2.5 million of shares of our common stock at a purchase price of $2.587 per share. In addition, for a period of 30 months, we have the right, at our sole discretion, to sell up to an additional $27.5 million of our common stock based on prevailing market prices of our common stock at the time of each sale. In consideration for entering into the purchase agreement, we issued approximately 0.3 million shares of our common stock to LPC as a commitment fee. The purchase agreement limits our sales of shares of common stock to LPC to approximately 5.2 million shares of common stock, representing 19.99% of the shares of common stock outstanding on the date of the purchase agreement. The purchase agreement also prohibits us from directing LPC to purchase any shares of common stock if those shares, when aggregated with all other shares of our common stock then beneficially owned by LPC and its affiliates, would result in LPC and its affiliates having beneficial ownership, at any single point in time, of more than 9.99% of the then total outstanding shares of our common stock. In 2020, we sold approximately 1.5 million shares of common stock resulting in $3.5 million of net proceeds. As of December 31, 2020, we had $24.0 million remaining under our agreement with LPC.

In June 2019, we completed an underwritten public offering (the "2019 Public Offering") in which we received net proceeds of $38.4 million and issued approximately 12.1 million shares of our common stock. We incurred $3.9 million of offering-related expenses for the 2019 Public Offering.

In February 2019, we completed a private placement (the "2019 Private Placement") in which we received net cash proceeds of $13.8 million and issued approximately 3.2 million shares of our common stock, pre-funded warrants to purchase approximately 0.5 million shares of our common stock, and warrants to purchase approximately 0.9 million shares of our common stock.

As reflected in our consolidated financial statements, we used cash to fund operating activities of $41.7 million during 2020 and had $79.8 million available in cash and cash equivalents at December 31, 2020. In addition, we had an accumulated deficit of $374.7 million and anticipate that we will continue to incur significant operating losses for the foreseeable future as we continue to develop our product candidates. Until such time, if ever, as we attempt to generate substantial product revenue and achieve profitability, we expect to finance our cash needs through a combination of equity offerings and strategic transactions, and other sources of funding. If we are unable to raise additional funds when needed, we may be required to implement cost reduction strategies, including ceasing development of GEN-009, GEN-011 or other corporate programs and activities. Our available cash and cash equivalents at December 31, 2020 are expected to fund operations to mid-2022, and we have strategic plans to extend our operating cash to the end of 2022.

Costs related to clinical trials can be unpredictable and there can be no guarantee that our current balances of cash and cash equivalents, combined with proceeds received from other sources, will be sufficient to fund our trials or operations through this period. These funds will not be sufficient to enable us to conduct pivotal clinical trials for, seek marketing approval for, or commercially launch GEN-009, GEN-011 or any other product candidate. Accordingly, we will be required to obtain further funding through public or private equity offerings, collaboration and licensing arrangements, or other sources. Adequate additional financing may not be available to us on acceptable terms, or at all, which could result in a decision to pause or delay development or advancement of clinical trials for one or more of our product candidates. Similarly, we may decide to pause or delay development or advancement of clinical trials for one or more of our product candidates if we believe that such development or advancement is imprudent or impractical.

**Financial Overview**

***Revenues***

We have not generated any revenues from product sales to date and we do not expect to generate revenues from product sales for the foreseeable future. Our 2020 revenue was derived from the MTA with Shionogi. See **Note 3. Revenue** within the notes to the consolidated financial statements in this Annual Report on Form 10-K.

***Research and development expenses***

Research and development expenses consist primarily of costs incurred to advance our preclinical and clinical candidates, which include:

- salaries and related expenses;
- expenses incurred under agreements with contract research organizations ("CROs"), contract manufacturing organizations ("CMOs"), consultants, and other vendors that conduct our clinical trials and preclinical activities;
- costs of acquiring, developing, and manufacturing clinical trial materials and lab supplies; and
- facility costs, depreciation, and other expenses, which include direct and allocated expenses for rent and maintenance of facilities, insurance, and other supplies.

The following table summarizes research and development expenses for our product candidates in 2020 and 2019 (in thousands):

| | Years Ended December 31 | |
|---|---|---|
| | 2020 | 2019 |
| Phase 1/2a programs | $ 15,227 | $ 16,462 |
| Discovery and pre-IND | 12,813 | 7,141 |
| Other research and development | 5,920 | 3,349 |
| Total research and development | $ 33,960 | $ 26,952 |

Phase 1/2a programs are Phase 1 or Phase 2 development activities. Discovery and pre-IND includes costs incurred to support our discovery research and translational science efforts up to the initiation of Phase 1 development. Other research and development include costs that are not specifically allocated to active programs, including facilities costs, depreciation expense, and other costs.

***General and administrative expenses***

General and administrative expenses consist primarily of salaries and related expenses for personnel in executive and other administrative functions. Other general and administrative expenses include facility costs, professional fees associated with consulting, corporate and intellectual property legal expenses, and accounting services.

***Other income (expense)***

Other income (expense) consists of the change in the fair value of the warrant liability, transaction expenses, interest expense, net of interest income, gains and losses on sale and disposal of assets, and gains and losses on foreign currency.

**Critical Accounting Policies and Significant Judgments and Estimates**

Our management's discussion and analysis of our financial position and results of operations is based on our consolidated financial statements, which have been prepared in conformity with U.S. generally accepted accounting principles ("GAAP"). The preparation of consolidated financial statements in conformity with GAAP requires us to make estimates and judgments that affect the amounts of assets, liabilities and expenses reported in the consolidated financial statements and accompanying notes. On an ongoing basis, we evaluate these estimates and judgments, including those described below. We base our estimates on historical experience and other market-specific or other relevant assumptions that we believe to be reasonable under the circumstances. These estimates and assumptions form the basis for making judgments about the carrying values of assets and liabilities that are not readily apparent from other sources. Actual results may differ materially from those estimates or assumptions.

While our significant accounting policies are described in more detail in **Note 2. Summary of significant accounting policies** within the notes to the consolidated financial statements in this Annual Report on Form 10-K, we believe the following accounting policies are the most critical to fully understanding and evaluating our reported financial results and affect the more significant judgments and estimates that we use in the preparation of our consolidated financial statements.

***Revenue Recognition***

We recognize revenue when a customer obtains control of promised goods or services. The amount of revenue recognized reflects the consideration to which we expect to be entitled in exchange for these goods and services. To achieve this core principle, we apply the following five steps: 1) identify the customer contract; 2) identify the contract's performance obligations; 3) determine the transaction price; 4) allocate the transaction price to the performance obligations; and 5) recognize revenue when or as a performance obligation is satisfied.

We utilize key assumptions to determine the standalone selling price, which may include other comparable transactions, pricing considered in negotiating the transaction and the estimated costs to complete the respective performance obligation. We also utilize judgement in assessing whether or not variable consideration is constrained or if it can be allocated specifically to one or more performance obligations in the arrangement.

When a performance obligation is satisfied, revenue is recognized for the amount of the transaction price that is allocated to that performance obligation on a relative standalone selling price basis, excluding estimates of variable consideration that are constrained. For performance obligations consisting of licenses and other promises, we utilize judgment to assess whether the combined performance obligation is satisfied over time or at a point in time and the recognition pattern for the portion of the transaction price allocated to the performance obligation.

***Research and Development Expenses***

Research and development costs are expensed as incurred. Research and development expenses include fees paid to CROs in connection with clinical trials, CMOs with respect to preclinical and clinical materials and intermediaries, and vendors in connection with preclinical development activities. Nonrefundable advanced payments for goods or services to be received in the future for use in research and development activities are deferred and capitalized. The capitalized amounts are expensed as the related goods are delivered or the services are performed or when the goods have been received rather than when the payment is made. We conduct a thorough review of open contracts and purchase orders as well as an evaluation by internal personnel to identify services received that have been performed in order to establish an estimate of the associated cost incurred for these services for which we have not yet been invoiced or otherwise notified of the actual cost. The majority of our service providers invoice us monthly in arrears for services performed or when contractual milestones are met. We make estimates of our accrued research and development expenses as of each balance sheet date in our consolidated financial statements based on facts and circumstances known to us at that time. We periodically confirm the accuracy of our estimates with the service providers and make adjustments, if necessary.

We base our expenses related to clinical trials on our estimates of the services performed pursuant to contracts with clinical sites that conduct clinical trials 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. Payments under some of these contracts depend on factors such as the successful enrollment of patients and the completion of required data submission. In recording service fees, we make estimates based upon the time period over which services will be performed or other observable and measurable progress points as defined in the contracts, such as number of patients enrolled, number of sites, or extent of services performed in each period. The calculated amount of service fee expense is compared to the actual payments made pursuant to the contract's billing schedule to determine the resulting prepaid or accrual position. If our estimates of the status and timing of services performed differs from the actual status and timing of services performed, we may report amounts that are too high or too low in any particular period. To date, there has been no material differences from our estimates to the amount incurred.

***Fair Value of Warrant Liabilities***

We remeasure the fair value of our liability-classified warrants at each reporting date. We calculate the estimated fair value of the liability-classified warrants using a Monte Carlo simulation. The Monte Carlo simulation requires the input of assumptions, including our stock price, the volatility of our stock price, remaining term in years, expected dividend yield, and risk-free rate. In addition, the valuation model considers our probability of being acquired during each annual period within the terms of our liability-classified warrants, as an acquisition event can potentially impact the settlement. Changes to the assumptions used in determining the fair value of our liability-classified warrants could result in materially different fair values for these warrant liabilities.

**Results of Operations**

***Comparison of 2020 and 2019***

| | Years Ended December 31 | |
|---|---|---|
| | 2020 | 2019 |
| | (in thousands) | |
| License revenue | $ 1,359 | $ — |
| Operating expenses: | | |
| Research and development | 33,960 | 26,952 |
| General and administrative | 14,388 | 12,037 |
| Total operating expenses | 48,348 | 38,989 |
| Loss from operations | (46,989) | (38,989) |
| Other income (expense): | | |
| Change in fair value of warrants | 8,889 | 986 |
| Interest expense, net | (1,380) | (946) |
| Other expense | (4,234) | (1) |
| Total other income | 3,275 | 39 |
| Net loss | $ (43,714) | $ (38,950) |

*License revenue*

Revenue increased by $1.4 million in 2020 compared to 2019 due to revenue recognized in connection with the MTA with Shionogi.

*Research and development expenses*

Research and development expenses increased $7.0 million in 2020 compared to 2019. The increase was due largely to increased headcount-related costs of $3.9 million, higher external development costs of $2.1 million and increased clinical costs of $0.8 million.

We expect that our overall research and development expenses will increase due to the continued development of our clinical operations and related clinical supply costs for our GEN-011 program.

*General and administrative expenses*

General and administrative expense increased $2.4 million in 2020 compared to 2019 primarily due to increased rent expense of approximately $1.6 million, higher professional services fees of approximately $1.3 million and increased insurance expense of approximately $0.4 million, partially offset by lower headcount-related costs of approximately $1.0 million.

We anticipate that our general and administrative expenses will increase in the future to support the expected growth in our business, expand our operations and organizational capabilities. Additionally, if and when we believe regulatory approval of our first product candidate appears likely, we anticipate that we will incur increased costs in preparation for commercial launch.

*Change in fair value of warrants*

Change in fair value of warrants reflects the non-cash change in the fair value of our liability-classified warrants, which are recorded at their fair value on the date of issuance and then remeasured at the end of each reporting period. The increase in the change in the fair value of warrants in 2020 compared to 2019 was primarily attributed to the decrease in our stock price between the initial valuation of our closing warrants ("2020 Warrants") issued in the 2020 Private Placement and the remeasurement at December 31, 2020.

*Interest expense, net*

Interest expense, net, consists primarily of interest expense on our long-term debt facilities, offset by interest earned on our cash equivalents.

*Other expense*

Other expense in 2020 consists primarily of transaction costs incurred in connection with the 2020 Private Placement and allocated to the liability-classified 2020 Warrants.

**Liquidity and Capital Resources**

***Overview***

Since our inception in 2006, we have funded operations primarily through proceeds from issuances of common stock and long-term debt.

As of December 31, 2020, we had $79.8 million in cash and cash equivalents.

On February 18, 2021, we entered into a Loan and Security Agreement with SVB for a $10 million secured term loan. $9.0 million of the proceeds from the 2021 Term Loan were used to repay the borrowings that were outstanding at the 2021 Loan Closing Date under our previous loan and security agreement with Hercules, paying off all obligations owing under, and terminating, the previous loan and security agreement with Hercules on February 18, 2021. The remaining proceeds from the 2021 Term Loan of $1.0 million were received by us for working capital and general corporate purposes. The 2021 Term Loan will mature on September 1, 2023, which may be extended to March 1, 2024 if certain performance milestones are achieved and no event of default has occurred or is continuing. The 2021 Term Loan accrues interest at a floating per annum rate equal to the greater of (i) 6.25% or (ii) the sum of 3.0% plus the prime rate. The 2021 Term Loan provides for interest-only payments until September 30, 2021, which may be extended to March 31, 2022 if certain performance milestones are achieved and no event of default has occurred or is continuing. Thereafter, amortization payments will be payable monthly in equal installments of principal and interest (subject to recalculation upon a change in prime rates) upon expiration of the interest only period through maturity. The 2021 Term Loan is subject to a final payment charge of $0.5 million. The 2021 Term Loan may be prepaid in whole (but not in part), subject to a prepayment charge of 3.0%, if prepaid in any of the first twelve (12) months following the Closing Date, 2.0%, if prepaid after twelve (12) months following the Closing Date but on or prior to twenty four (24) months following the Closing Date, and 1.0% thereafter. Amounts outstanding during an event of default shall be payable on demand and shall accrue interest at an additional rate of 4.0% per annum.

We have not generated any revenues from product sales to date and we do not expect to generate revenues from product sales for the foreseeable future. Our revenues for 2020 were derived from the MTA with Shionogi.

In July 2020, we completed the 2020 Private Placement and received net cash proceeds of $74.5 million. In connection with the 2020 Private Placement, we issued approximately 21.4 million shares of our common stock, approximately 12.2 million pre-funded warrants to purchase additional shares of our common stock and warrants to purchase approximately 33.6 million shares of our common stock.

In 2020, we sold approximately 2.4 million shares under our ATM program and received net proceeds of $5.8 million, after deducting commissions. In 2019, we sold no shares under the ATM program. As of December 31, 2020, we had $39.9 million in gross proceeds remaining under the ATM.

In October 2019, we entered into a purchase agreement with LPC ("LPC Agreement") pursuant to which LPC purchased $2.5 million of shares of our common stock at a purchase price of $2.587 per share. In addition, for a period of 30 months, we have the right, at our sole discretion, to sell up to an additional $27.5 million of our common stock based on prevailing market prices of our common stock at the time of each sale. In consideration for entering into the purchase agreement, we issued approximately 0.3 million shares of our common stock to LPC as a commitment fee. The purchase agreement limits our sales of shares of common stock to LPC to approximately 5.2 million shares of common stock, representing 19.99% of the shares of common stock outstanding on the date of the purchase agreement. The purchase agreement also prohibits us from directing LPC to purchase any shares of common stock if those shares, when aggregated with all other shares of our common stock then beneficially owned by LPC and its affiliates, would result in LPC and its affiliates having beneficial ownership, at any single point in time, of more than 9.99% of the then total outstanding shares of our common stock. In 2020, we sold approximately 1.5 million shares of common stock resulting in $3.5 million of net proceeds. As of December 31, 2020, we had $24.0 million remaining under its agreement with LPC.

In June 2019, we completed an underwritten public offering (the “2019 Public Offering”) in which we received net proceeds of $38.4 million and issued approximately 12.1 million shares of our common stock. We incurred $3.9 million of offering-related expenses for the 2019 Public Offering.

In February 2019, we completed the 2019 Private Placement and received net cash proceeds of $13.8 million. In connection with the 2019 Private Placement, we issued approximately 3.2 million shares of common stock, pre-funded warrants to purchase approximately 0.5 million shares of common stock and warrants to purchase up to approximately 0.9 million shares of common stock.

***Cash Flows***

The following table summarizes our sources and uses of cash in 2020 and 2019 (in thousands):

| | Years Ended December 31 | |
|---|---|---|
| | **2020** | **2019** |
| Net cash used in operating activities | $ (41,651) | $ (37,734) |
| Net cash used in investing activities | (2,555) | (1,087) |
| Net cash provided by financing activities | 83,848 | 52,901 |
| Net increase in cash and cash equivalents | $ 39,642 | $ 14,080 |

*Operating Activities*

Net cash used in operations increased $3.9 million in 2020 compared to 2019 due to offering costs related to the 2020 Private Placement that were allocated to the 2020 Warrants and expensed.

*Investing Activities*

Net cash used in investing activities increased $1.5 million in 2020 compared to 2019 due to increased purchases of property and equipment.

*Financing Activities*

Net cash provided by financing activities increased $30.9 million in 2020 compared to 2019. In 2020, the 2020 Private Placement generated net proceeds of $74.5 million, our ATM program generated net proceeds of $5.8 million, and the LPC Agreement generated net proceeds of $3.5 million. In 2019, the 2019 Private Placement generated net proceeds of $13.8 million, the 2019 Public Offering generated net proceeds of $38.4 million, and the LPC Agreement generated net proceeds of $2.5 million, offset by the repayment of long-term debt of $1.9 million.

***Operating Capital Requirements***

Our primary uses of capital are for salaries and related expenses for personnel, manufacturing costs for preclinical and clinical materials, third-party clinical trial services, laboratory and related supplies, legal and other regulatory expenses, and general overhead costs. We expect these costs will continue to be the primary operating capital requirements for the near future.

We expect that our existing cash and cash equivalents are sufficient to support our operations to mid-2022, and we have strategic plans to extend our operating cash to the end of 2022. We have based our projections of operating capital requirements on assumptions that may prove to be incorrect and we may use all of our available capital resources sooner than we expect. Because of the numerous risks and uncertainties associated with research, development and commercialization of pharmaceutical products coupled with the global economic uncertainty that has arisen with the outbreak of the coronavirus, or referred to as COVID-19, we are unable to estimate the exact amount of our operating capital requirements. Our future funding requirements will depend on many factors, including, but not limited to:

- the timing and costs of our planned clinical trials for GEN-011;
- the progress, timing, and costs of manufacturing GEN-011 for planned clinical trials;
- the timing and costs we require to perform monitoring activities to support the GEN-009 clinical trial;
- the initiation, progress, timing, costs, and results of preclinical studies and clinical trials for our other product candidates and potential product candidates;
- the terms and timing of any future collaborations, grants, licensing, consulting, or other arrangements that we may establish;
- the amount and timing of any payments we may be required to make, or that we may receive, in connection with the licensing, filing, prosecution, defense and enforcement of any patents or other intellectual property rights, including milestone payments, royalty payments and patent prosecution fees that we are obligated to pay pursuant to our license agreements;
- the costs of preparing, filing, and prosecuting patent applications, maintaining and protecting our intellectual property rights, and defending against intellectual property related claims;
- the extent to which we in-license or acquire other products and technologies;
- the receipt of marketing approval;
- the costs of commercialization activities for GEN-009, GEN-011 and other product candidates, if we receive marketing approval, including the costs and timing of establishing product sales, marketing, distribution, and manufacturing capabilities; and
- revenue received from commercial sales of our product candidates.

We will need to obtain substantial additional funding in order to complete clinical trials and receive regulatory approval for GEN-009, GEN-011 and our other product candidates. To the extent that we raise additional capital through the sale of our common stock, convertible securities, or other equity securities, the ownership interests of our existing stockholders may be materially diluted and the terms of these securities could include liquidation or other preferences that could adversely affect the rights of our existing stockholders. If we are unable to raise capital when needed or on attractive terms, we could be forced to significantly delay, scale back, or discontinue the development of GEN-009, GEN-011 or our other product candidates, seek collaborators at an earlier stage than otherwise would be desirable or on terms that are less favorable than might otherwise be available, and relinquish or license, potentially on unfavorable terms, our rights to GEN-009, GEN-011 or our other product candidates that we otherwise would seek to develop or commercialize ourselves.

***Off-Balance Sheet Arrangements***

We do not have any off-balance sheet arrangements.

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

We had cash and cash equivalents of $79.8 million as of December 31, 2020. The primary objectives of our investment activities are to preserve principal, provide liquidity and maximize income without significantly increasing risk. Our primary exposure to market risk relates to fluctuations in interest rates, which are affected by changes in the general level of U.S. interest rates. Given the short-term nature of our cash and cash equivalents, we believe that a sudden change in market interest rates would not be expected to have a material impact on our financial condition and/or results of operations. We do not own any derivative financial instruments.

We do not believe that our cash and cash equivalents have significant risk of default or illiquidity. While we believe our cash and cash equivalents do not contain excessive risk, we cannot provide absolute assurance that in the future our investments will not be subject to adverse changes in market value. In addition, we maintain significant amounts of cash and cash equivalents at one or more financial institutions that are in excess of federally insured limits.

We currently do not have significant exposure to foreign currencies as we hold no foreign exchange contracts, option contracts, or other foreign hedging arrangements. Further, our operations are primarily denominated in U.S. dollars. Our operations may be subject to fluctuations in foreign currency exchange rates in the future.

Inflation generally affects us by increasing our cost of labor and clinical trial costs. We do not believe that inflation had a material effect on our results of operations during 2020.

**Item 8. Financial Statements and Supplementary Data**

Our consolidated financial statements, together with the report of our independent registered public accounting firm, appear beginning on page F-1 of this Annual Report on Form 10-K.

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

Not applicable.

**Item 9A. Controls and Procedures**

**Evaluation of Disclosure Controls and Procedures**

We maintain disclosure controls and procedures that are designed to ensure that information required to be disclosed in the reports that we file or submit under the Securities and Exchange Act of 1934 (the "Exchange Act") is (1) recorded, processed, summarized, and reported within the time periods specified in the SEC's rules and forms, and (2) accumulated and communicated to our management, including our principal executive officer and principal financial officer, to allow timely decisions regarding required disclosure.

Our management, with the participation of our Chief Executive Officer and Chief Financial Officer, evaluated the effectiveness of our disclosure controls and procedures as of December 31, 2020 (as defined in Rules 13a-15(e) and 15d-15(e) under the Exchange Act). Our management recognizes that any controls and procedures, no matter how well designed and operated, can provide only reasonable assurance of achieving their objectives, and management necessarily applies its judgment in evaluating the cost-benefit relationship of possible controls and procedures. Our principal executive officer and principal financial officer have concluded, based upon the evaluation described above that, as of December 31, 2020, our disclosure controls and procedures were effective at the reasonable-assurance level.

**Management's Annual Report on Internal Controls Over Financial Reporting**

Our management is responsible for establishing and maintaining adequate internal control over our financial reporting. Internal control over financial reporting is defined in Rules 13a-15(f) and 15d-15(f) under the Exchange Act as the process designed by, or under the supervision of, our Chief Executive Officer and our Chief Financial Officer, and effected by our board of directors, management, and other personnel, to provide reasonable assurance regarding the reliability of our financial reporting and the preparation of our financial statements for external purposes in accordance with generally accepted accounting principles ("GAAP"), and includes those policies and procedures that:

(1) pertain to the maintenance of records that, in reasonable detail, accurately and fairly reflect the transactions and dispositions of assets;

(2) provide reasonable assurance that transactions are recorded as necessary to permit preparation of financial statements in accordance with GAAP, and that receipts and expenditures are being made only in accordance with the authorizations of management and directors; and

(3) provide reasonable assurance regarding the prevention or timely detection of unauthorized acquisition, use or disposition of assets that could have a material effect on our financial statements.

Under the supervision and with the participation of our management, including our Chief Executive Officer and Chief Financial Officer, we conducted an evaluation of the effectiveness of our internal control over financial reporting based on the framework provided in Internal Control - Integrated Framework (2013) issued by the Committee of Sponsoring Organizations of the Treadway Commission ("COSO"). Based on this evaluation, our management concluded that our internal control over financial reporting was effective as of December 31, 2020.

**Changes in Internal Control Over Financial Reporting**

During the quarter ended December 31, 2020, there have been no changes in our internal control over financial reporting, as such term is defined in Rules 13a-15(f) and 15(d)-15(f) promulgated under the Exchange Act, that have materially affected, or are reasonably likely to materially affect, our internal control over financial reporting.

**Item 9B. Other Information**

On February 18, 2021, the Company entered into a Loan and Security Agreement (the "2021 Loan Agreement") with Silicon Valley Bank for a $10 million secured term loan. $9.0 million of the proceeds from the 2021 Term Loan were used to repay the Company's borrowings that were outstanding at the 2021 Loan Closing Date under its previous loan and security agreement with Hercules, paying off all obligations owing under, and terminating, the previous loan and security agreement with Hercules on February 18, 2021. The remaining proceeds from the 2021 Term Loan of $1.0 million were received by the Company for working capital and general corporate purposes.

The 2021 Term Loan will mature on September 1, 2023, which may be extended to March 1, 2024 if certain performance milestones are achieved and no event of default has occurred or is continuing. The 2021 Term Loan accrues interest at a floating per annum rate equal to the greater of (i) 6.25% or (ii) the sum of 3.0% plus the prime rate. The 2021 Term Loan provides for interest-only payments until September 30, 2021, which may be extended to March 31, 2022 if certain performance milestones are achieved and no event of default has occurred or is continuing. Thereafter, amortization payments will be payable monthly in equal installments of principal and interest (subject to recalculation upon a change in prime rates) upon expiration of the interest only period through maturity. The 2021 Term Loan is subject to a final payment charge of $0.5 million. The 2021 Term Loan may be prepaid in whole (but not in part), subject to a prepayment charge of 3.0%, if prepaid in any of the first twelve (12) months following the Closing Date, 2.0%, if prepaid after twelve (12) months following the Closing Date but on or prior to twenty four (24) months following the Closing Date, and 1.0% thereafter. Amounts outstanding during an event of default shall be payable on demand and shall accrue interest at an additional rate of 4.0% per annum.

The 2021 Term Loan is secured by a lien on substantially all of the assets of the Company, other than intellectual property (but includes proceeds from intellectual property).

The 2021 Loan Agreement contains customary covenants and representations, including a financial reporting covenant and limitations on dividends, indebtedness, liens, investments, distributions, transfers, mergers or acquisitions, transactions with affiliates, corporate changes, deposit accounts, and subsidiaries. There are no financial covenants.

In connection with the 2021 Loan Agreement, the Company issued to SVB a warrant, dated February 18, 2021 (the "2021 Warrant") to purchase shares of the common stock of the Company. The 2021 Warrant is exercisable for 43,478 shares of the Company’s common stock with an exercise price of $3.45 per share. The exercise price and the number of shares are subject to adjustment upon a merger event, reclassification of the shares of common stock, subdivision or combination of the shares of common stock or certain dividends payments. The 2021 Warrant is exercisable until the fifth anniversary of the 2021 Loan Closing Date and will be exercised automatically on a net issuance basis if not exercised prior to the expiration date and if the then-current fair market value of one share of common stock is greater than the exercise price then in effect.

The foregoing descriptions of the 2021 Warrant and the 2021 Loan Agreement do not purport to be complete and are qualified in their entirety by reference to the 2021 Warrant and 2021 Loan Agreement, which are filed as Exhibits 4.10 and 10.26, respectively.

## PART III

### Item 10. Directors, Executive Officers and Corporate Governance

Other than the information regarding our executive officers provided in Part I of this report under the heading "Business—Information about our Executive Officers," the information required to be furnished pursuant to this item is incorporated herein by reference to our definitive proxy statement for the 2021 Annual Meeting of the Stockholders.

### Item 11. Executive and Director Compensation

The information required by this Item 11 is incorporated herein by reference from our definitive proxy statement for the 2021 Annual Meeting of Stockholders.

### Item 12. Security Ownership of Certain Beneficial Owners and Management and Related Stockholder Matters

The information required by this Item 12 is incorporated herein by reference from our definitive proxy statement for the 2021 Annual Meeting of Stockholders.

### Item 13. Certain Relationships and Related Party Transactions and Director Independence

The information required by this Item 13 is incorporated herein by reference from our definitive proxy statement for the 2021 Annual Meeting of Stockholders.

### Item 14. Principal Accountant Fees and Services

The information required by this Item 14 is incorporated herein by reference from our definitive proxy statement for the 2021 Annual Meeting of Stockholders.

## PART IV

### Item 15. Exhibits and Financial Statement Schedules

**Financial Statements**

The following financial statements and supplementary data are filed as a part of this Annual Report on Form 10-K.

Report of Independent Registered Public Accounting Firm

Consolidated Balance Sheets as of December 31, 2020 and 2019

Consolidated Statements of Operations and Comprehensive Loss for the years ended December 31, 2020 and 2019

Consolidated Statements of Stockholders' Equity for the years ended December 31, 2020 and 2019

Consolidated Statements of Cash Flows for the years ended December 31, 2020 and 2019

Notes to Consolidated Financial Statements

### Item 16. Form 10-K Summary

None.

**Financial Statement Schedules**

All financial statement schedules are omitted because they are not applicable or the required information is included in the financial statements or notes thereto.

**Exhibits**

Those exhibits required to be filed by Item 601 of Regulation S-K are listed in the Exhibit Index immediately preceding the exhibits hereto and such listing is incorporated herein by reference.

**Genocea Biosciences, Inc.**

**Index to Financial Statements**

## Report of Independent Registered Public Accounting Firm

The Board of Directors and Stockholders of
Genocea Biosciences, Inc.

**Opinion on the Financial Statements**

We have audited the accompanying consolidated balance sheets of Genocea Biosciences, Inc. (the Company) as of December 31, 2020 and 2019, the related consolidated statements of operations and comprehensive loss, stockholders' equity and cash flows for the years ended December 31, 2020 and 2019, and the related notes (collectively referred to as the "financial statements"). In our opinion, the consolidated financial statements present fairly, in all material respects, the financial position of the Company at December 31, 2020 and 2019, and the consolidated results of its operations and its cash flows for the years ended December 31, 2020 and 2019, in conformity with U.S. generally accepted accounting principles.

**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 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.

**Critical Audit Matters**

The critical audit matters communicated below are matters arising from the current period audit of the financial statements that were communicated or required to be communicated to the audit committee and that: (1) relate to accounts or disclosures that are material to the financial statements and (2) involved our especially challenging, subjective or complex judgments. The communication of critical audit matters does not alter in any way our opinion on the consolidated financial statements, taken as a whole, and we are not, by communicating the critical audit matters below, providing separate opinions on the critical audit matters or on the accounts or disclosures to which they relate.

***Research and Development Accruals***

*Description of the Matter*

The Company's accrual for research and development expenses totaled $2.6 million at December 31, 2020. As discussed in Note 2 to the consolidated financial statements, the Company entered into various research and development contracts with the third-party service providers. The Company's determination of costs incurred to conduct research and development of the Company's product candidates and the related accrued expenses at each reporting period incorporates judgment and is based on the extent of services provided by each vendor for preclinical, clinical trial and manufacturing activities. Payments for these activities are based on the terms of the individual arrangements, which often differ from the pattern of costs incurred.

Auditing the Company's research and development accruals for clinical trial and manufacturing expenses was especially challenging due to the volume of third-party vendors and judgmental because these accruals are based on various assumptions, including an evaluation of the information provided to the Company by third parties on actual costs incurred but not yet billed, estimated project timelines, and patient enrollment.

*How We Addressed the Matter in Our Audit*

To test the research and development accrual, our audit procedures included, among others, testing the accuracy and completeness of the underlying data used to determine the accrual and evaluating and testing the significant assumptions described above. More specifically, we inspected the contracts and any amendments to the contracts with third-party service providers, corroborated the progress of clinical trials, manufacturing runs and other research and development projects with the Company's research and development personnel, and reviewed information received directly from third party vendors which included an estimate of costs incurred to date. We also tested a sample of subsequent invoices received from third parties to test that amounts were recorded in the appropriate period.

***Warrant Liabilities***

*Description of the Matter*

The Company's warrant liabilities totaled $56.1 million at December 31, 2020. As discussed in Note 10 to the consolidated financial statements, certain of the warrants for the purchase of shares of common stock issued by the Company require liability classification and are recorded at fair value each reporting period. The Company determines the fair value of the warrants utilizing Monte Carlo simulation models.

Auditing the Company's valuation of its warrant liabilities was especially challenging as the fair value is based on various inputs and significant assumptions used in Monte Carlo simulation models such as the probability of a change in control and a discount for lack of marketability, as applicable. In addition, certain of the assumptions were based on management's judgement, and therefore are not objectively verifiable.

*How We Addressed the Matter in Our Audit*

To test the warrant liabilities, our audit procedures included, among others, testing the Monte Carlo simulation models, and assessing the reasonableness of the significant assumptions, as described above. We involved valuation specialists to assess the valuation models and to assist in auditing certain significant assumptions. We tested the significant assumptions by agreeing amounts to contracts, third-party data and analyses prepared by the Company. In addition, we performed sensitivity analyses to evaluate the materiality of reasonable changes in management's assumptions.

/s/ Ernst & Young LLP

We have served as the Company's auditor since 2009.

Boston, Massachusetts
February 22, 2021

**Genocea Biosciences, Inc.**
**Consolidated Balance Sheets**
**(In thousands, except share data)**

| | December 31 | |
|---|---|---|
| | 2020 | 2019 |
| **Assets** | | |
| Current assets: | | |
| Cash and cash equivalents | $ 79,769 | $ 40,127 |
| Prepaid expenses and other current assets | 2,458 | 1,457 |
| Total current assets | 82,227 | 41,584 |
| Property and equipment, net | 5,123 | 2,617 |
| Right of use assets | 9,308 | 6,306 |
| Restricted cash | 631 | 631 |
| Other non-current assets | 1,204 | 1,473 |
| Total assets | $ 98,493 | $ 52,611 |
| | | |
| **Liabilities and stockholders' equity** | | |
| Current liabilities: | | |
| Accounts payable | $ 534 | $ 553 |
| Accrued expenses and other current liabilities | 7,344 | 4,611 |
| Deferred revenue | 1,641 | — |
| Lease liabilities | 1,614 | 1,117 |
| Current portion of long-term debt | 13,862 | — |
| Total current liabilities | 24,995 | 6,281 |
| Non-current liabilities: | | |
| Warrant liabilities | 56,118 | 2,486 |
| Lease liabilities, net of current portion | 8,398 | 5,395 |
| Long-term debt, net of current portion | — | 13,407 |
| Total liabilities | 89,511 | 27,569 |
| Commitments and contingencies (Note 7) | | |
| Stockholders' equity: | | |
| Preferred stock, $0.001 par value; (shares authorized of 25,000,000 at December 31, 2020 and 2019; — shares issued and outstanding at December 31, 2020 and 1,635 shares issued and outstanding at December 31, 2019) | — | 701 |
| Common stock, $0.001 par value; (shares authorized of 170,000,000 and 85,000,000 at December 31, 2020 and 2019, respectively; 53,018,813 shares issued and outstanding at December 31, 2020 and 27,452,900 shares issued and outstanding at December 31, 2019) | 53 | 27 |
| Additional paid-in capital | 383,597 | 355,268 |
| Accumulated deficit | (374,668) | (330,954) |
| Total stockholders' equity | 8,982 | 25,042 |
| Total liabilities and stockholders' equity | $ 98,493 | $ 52,611 |

See accompanying notes to consolidated financial statements.

**Genocea Biosciences, Inc.**
**Consolidated Statements of Operations and Comprehensive Loss**
**(In thousands, except per share data)**

| | Years Ended December 31 | |
|---|---|---|
| | 2020 | 2019 |
| License revenue | $ 1,359 | $ — |
| Operating expenses: | | |
| Research and development | 33,960 | 26,952 |
| General and administrative | 14,388 | 12,037 |
| Total operating expenses | 48,348 | 38,989 |
| Loss from operations | (46,989) | (38,989) |
| Other income (expense): | | |
| Change in fair value of warrants | 8,889 | 986 |
| Interest expense, net | (1,380) | (946) |
| Other expense | (4,234) | (1) |
| Total other income | 3,275 | 39 |
| Net loss | $ (43,714) | $ (38,950) |
| Comprehensive loss | $ (43,714) | $ (38,950) |
| Net loss per share: | | |
| Basic | $ (0.98) | $ (1.89) |
| Diluted | $ (1.11) | $ (1.89) |
| Weighted-average number of shares used in computing net loss per share: | | |
| Basic | 44,436 | 20,644 |
| Diluted | 46,553 | 20,644 |

See accompanying notes to consolidated financial statements.

**Genocea Biosciences, Inc.**
**Consolidated Statements of Stockholders' Equity**
**(In thousands)**

| | Common Stock | | Preferred Stock | Additional Paid-In | Accumulated | Total Stockholders' |
|---|---|---|---|---|---|---|
| | Shares | Amount | Amount | Capital | Deficit | Equity |
| **Balance at December 31, 2018** | 10,847 | $ 11 | $ 701 | $ 298,627 | $ (292,004) | $ 7,335 |
| Issuance of common stock, net | 16,530 | 16 | — | 54,653 | — | 54,669 |
| Stock-based compensation expense | — | — | — | 1,837 | — | 1,837 |
| Issuance of common stock under employee benefit plans | 76 | — | — | 151 | — | 151 |
| Net loss | — | — | — | — | (38,950) | (38,950) |
| **Balance at December 31, 2019** | 27,453 | 27 | 701 | 355,268 | (330,954) | 25,042 |
| Issuance of common stock, net | 25,280 | 26 | — | 25,508 | — | 25,534 |
| Stock-based compensation expense | — | — | — | 1,974 | — | 1,974 |
| Issuance of common stock under employee benefit plans | 81 | — | — | 146 | — | 146 |
| Conversion of preferred stock to common stock | 205 | — | (701) | 701 | — | — |
| Net loss | — | — | — | — | (43,714) | (43,714) |
| **Balance at December 31, 2020** | 53,019 | $ 53 | $ — | $ 383,597 | $ (374,668) | $ 8,982 |

See accompanying notes to consolidated financial statements.

**Genocea Biosciences, Inc.**
**Consolidated Statements of Cash Flows**
**(In thousands)**

| | Years Ended December 31 | |
|---|---|---|
| | 2020 | 2019 |
| **Operating activities** | | |
| Net loss | $ (43,714) | $ (38,950) |
| Adjustments to reconcile net loss to net cash used in operating activities: | | |
| Depreciation and amortization | 1,138 | 1,097 |
| Stock-based compensation | 1,974 | 1,837 |
| Change in fair value of warrant liability | (8,889) | (986) |
| Allocation of proceeds to transaction expenses | 4,219 | — |
| Non-cash interest expense | 455 | 504 |
| Other | 122 | 81 |
| Changes in operating assets and liabilities: | | |
| Prepaid expenses and other current assets | (1,051) | (803) |
| Right of use assets, net of lease liabilities | 634 | 206 |
| Other non-current assets | 269 | (423) |
| Accounts payable | 31 | (1,106) |
| Accrued expenses and other liabilities | 1,520 | 809 |
| Deferred revenue | 1,641 | — |
| Net cash used in operating activities | (41,651) | (37,734) |
| **Investing activities** | | |
| Purchases of property and equipment | (2,585) | (1,135) |
| Proceeds from sale of equipment | 30 | 48 |
| Net cash used in investing activities | (2,555) | (1,087) |
| **Financing activities** | | |
| Proceeds from issuance of common stock, net | 83,836 | 54,669 |
| Proceeds from issuance of common stock under employee benefit plans | 146 | 151 |
| Payments on finance lease | (134) | — |
| Repayment of long-term debt | — | (1,919) |
| Net cash provided by financing activities | 83,848 | 52,901 |
| Net increase in cash, cash equivalents and restricted cash | 39,642 | 14,080 |
| Cash, cash equivalents and restricted cash at beginning of period | 40,758 | 26,678 |
| Cash, cash equivalents and restricted cash at end of period | $ 80,400 | $ 40,758 |
| **Non-cash financing activities and supplemental cash flow information** | | |
| Right-of-use asset obtained in exchange for lease liabilities | $ 5,931 | $ 5,385 |
| Cash paid in connection with operating lease liabilities | $ 2,601 | $ 1,637 |
| Purchases of property and equipment included in accounts payable and accrued expenses and other liabilities | $ 1,212 | $ — |
| Cash paid for interest | $ 1,051 | $ 1,103 |

See accompanying notes to consolidated financial statements.

## 1. Organization and operations

Genocea Biosciences, Inc. ("Genocea" or the "Company") is a biopharmaceutical company that was incorporated in Delaware on August 16, 2006 and has a principal place of business in Cambridge, Massachusetts. The Company is dedicated to discovering and developing novel cancer immunotherapies using its proprietary ATLAS™ platform. The ATLAS platform profiles each patient's $CD4^+$ and $CD8^+$ T cell immune responses to every potential target or "antigen" identified by next generation sequencing of that patient's tumor. ATLAS zeroes in both antigens that activate anti-tumor T cell responses and inhibitory antigens, Inhibigens™, that drive pro-tumor immune responses. The Company believes this approach ensures that cancer immunotherapies, such as vaccines and cellular therapies, focus T cell responses on the tumor targets most vulnerable to T cell targeting. Consequently, Genocea believes that ATLAS may enable more immunogenic and efficacious cancer immunotherapies.

Genocea's GEN-011 program is an adoptive T cell therapy using neoantigen-targeted peripheral T cells (NPTs). The GEN-011 NPTs are specific for ATLAS-identified anti-tumor antigens that are used to manufacture a peripheral blood-derived, tumor-specific T cell therapy. GEN-011's use of peripheral blood brings potential patient accessibility and cost advantages by eliminating the need for extra surgery or viable tumor. The Company is initiating clinical sites and accruing patients for a first-in-human GEN-011 clinical trial. Our GEN-009 program is a neoantigen vaccine delivering adjuvanted synthetic long peptides spanning ATLAS-identified anti-tumor neoantigens. After reporting initial clinical responses for GEN-009 delivered in combination with standard-of-care checkpoint inhibitors ("CPIs") in 2020, the Company continues to monitor patients to confirm these initial efficacy signals.

The Company is devoting substantially all of its efforts to product research and development, initial market development, and raising capital. The Company has not generated any product revenue related to its primary business purpose to date and is subject to a number of risks and uncertainties common to companies in the biotech and pharmaceutical industry, including, but not limited to, the risks associated with the uncertainty of success of its preclinical and clinical trials; the challenges associated with gaining regulatory approval of product candidates; the risks associated with commercializing pharmaceutical products, if approved for marketing and sale; the potential for development by third parties of new technological innovations that may compete with the Company's products; the dependence on key personnel; the challenges of protecting proprietary technology; the need to comply with government regulations; the high cost of drug development; competition from other companies; the uncertainty of being able to secure additional capital when needed to fund operations; and the challenges and uncertainty associated with the outbreak of the coronavirus, or referred to as COVID-19, that have arisen in the global economy, that could adversely impact the Company's operations, supply chain, preclinical development work, clinical trials and ability to raise capital.

The Company regularly evaluates whether conditions and/or events raise substantial doubt about its ability to meet its future financial obligations as they become due within one year after the financial statements are issued. As of December 31, 2020, the Company had an accumulated deficit of $374.7 million and anticipates that it will continue to incur significant operating losses for the foreseeable future as it continues to develop its product candidates. Until such time, if ever, as the Company can generate substantial product revenue and achieve profitability, the Company expects to finance its cash needs through a combination of equity offerings, strategic transactions, or other sources of funding. If the Company is unable to raise additional funds when needed, the Company may be required to implement further cost reduction strategies, including ceasing development of GEN-011 or other corporate programs and activities.

As reflected in the consolidated financial statements, the Company had available cash and cash equivalents of $79.8 million at December 31, 2020. In addition, the Company used $41.7 million of cash for operating activities during 2020. The Company's available cash and cash equivalents at December 31, 2020 are expected to fund operations for a period of at least a year from the date the financial statements are issued.

Effective May 22, 2019, the Company effected a reverse stock split of its issued and outstanding common stock, par value $0.001, at a ratio of one-for-eight. The share and per share information presented in these financial statements and related notes have been retroactively adjusted to reflect the one-for-eight reverse stock split.

**2. Summary of significant accounting policies**

The consolidated financial statements have been prepared in conformity with accounting principles generally accepted in the United States ("U.S. GAAP"). The following is a summary of significant accounting policies followed in the preparation of these financial statements.

***Basis of presentation and principles of consolidation***

The accompanying consolidated financial statements include those accounts of the Company and a wholly owned subsidiary after elimination of all intercompany accounts and transactions. The Company operates as one segment, which is discovering, researching, developing and commercializing novel cancer immunotherapies.

***Use of estimates***

The preparation of financial statements in conformity with U.S. GAAP requires management to make estimates and assumptions that affect the amounts reported in the financial statements and accompanying notes. On an ongoing basis, the Company's management evaluates its estimates, which include, but are not limited to, estimates related to clinical trial accruals, estimates related to prepaid and accrued research and development expenses, revenue recognition, and warrant liabilities, which could change period to period based on changes in facts and circumstances. The Company bases its estimates on historical experience and other market-specific or other relevant assumptions that it believes to be reasonable under the circumstances. Actual results may differ from those estimates or assumptions.

***Foreign currency translation***

Realized and unrealized gains and losses resulting from foreign currency transactions denominated in currencies other than the functional currency are reflected as other (expense) income, net in the consolidated statements of operations.

***Revenue recognition***

Revenue is recognized when a customer obtains control of promised goods or services. The amount of revenue recognized reflects the consideration to which the Company expects to be entitled in exchange for these goods and services. To achieve this core principle, the Company applies the following five steps: 1) identify the customer contract; 2) identify the contract's performance obligations; 3) determine the transaction price; 4) allocate the transaction price to the performance obligations; and 5) recognize revenue when or as a performance obligation is satisfied.

Licensing arrangements are analyzed to determine whether the promised goods or services, which could include licenses and research and development materials and services, are distinct or whether they must be accounted for as part of a combined performance obligation. If the license is considered not to be distinct, the license would then be combined with other promised goods or services as a combined performance obligation. Certain contracts contain options to obtain future goods or services at a discount, which would not be provided without entering into the contract. These options are considered material rights, and therefore, are accounted for as separate performance obligations.

The transaction price is determined based on the consideration to which the Company will be entitled. The consideration promised may include fixed amounts, variable amounts, or both. For milestone payments, the Company estimates the amount of variable consideration by using the most likely amount method. In making this assessment, the Company evaluates factors such as the clinical, commercial and other risks that must be overcome to achieve the milestone. The Company re-evaluates the probability of realizing such variable consideration and any related constraints at each reporting period. The Company includes variable consideration in the transaction price to the extent it is probable that a significant reversal in the amount of cumulative revenue recognized will not occur.

If the contract contains a single performance obligation, the entire transaction price is allocated to the single performance obligation. Contracts that contain multiple performance obligations require an allocation of the transaction price among the performance obligations on a relative standalone selling price basis unless the transaction price is variable and meets the criteria to be allocated entirely to a performance obligation or to a distinct good or service that forms part of a single performance obligation.

The Company allocates the transaction price based on the estimated standalone selling price of the underlying performance obligations. The Company must develop assumptions that require judgment to determine the standalone selling price for each performance obligation identified in the contract. The Company utilizes key assumptions to determine the standalone selling price, which may include other comparable transactions, pricing considered in negotiating the transaction and the estimated costs to complete the respective performance obligation. Certain variable consideration is allocated specifically to one or more performance obligations in a contract when the terms of the variable consideration relate to the satisfaction of the performance obligation and the resulting amounts allocated to each performance obligation are consistent with the amount the Company would expect to receive for each performance obligation. The transaction price is allocated to each separate performance obligation on a relative standalone selling price basis.

When a performance obligation is satisfied, revenue is recognized for the amount of the transaction price allocated to that performance obligation on a relative standalone selling price basis, which excludes estimates of variable consideration that are constrained. Significant management judgment is required in determining the level of effort required under an arrangement and the period over which the Company is expected to complete its performance obligations under an arrangement.

For performance obligations consisting of licenses and other promises, the Company utilizes judgment to assess whether the combined performance obligation is satisfied over time or at a point in time and the recognition pattern of non-refundable, up-front fees.

***Contract liabilities***

The Company records a contract liability, classified as deferred revenue on its consolidated balance sheet, when it has received payment but has not yet satisfied the related performance obligations. In the event of an early termination of a contract with a customer, any contract liabilities would be recognized in the period in which all Company obligations under the agreement have been fulfilled.

***Cash and cash equivalents***

The Company considers only those investments which are highly liquid, readily convertible to cash and that mature within three months from date of purchase to be cash equivalents. The carrying values of money market funds approximate fair value due to their short-term maturities.

***Property and equipment***

Property and equipment is stated at cost, less accumulated depreciation. Maintenance and repairs that do not improve or extend the lives of the respective assets are expensed to operations as incurred, while costs of major additions and betterments are capitalized. Upon disposal, the related cost and accumulated depreciation is removed from the accounts and any resulting gain or loss is included in the statements of operations and comprehensive loss.

Depreciation is recorded using the straight-line method over the estimated useful lives of the respective assets, which are as follows:

| Asset class | Estimated useful life (in years) |
|---|---|
| Laboratory equipment | 5 |
| Furniture and office equipment | 5 |
| Computer hardware and software | 3 – 5 |
| Leasehold improvements | Shorter of the useful life or remaining lease term |

***Development of software for internal use***

Costs of materials, consultants, payroll, and payroll-related costs for employees incurred in developing internal-use software are capitalized as incurred. These costs are included in property and equipment, net on the consolidated balance sheet. Costs incurred during the preliminary project and post-implementation stages are charged to expense. Amortization is recorded using the straight-line method over the estimated useful lives of the respective asset which is three to five years.

***Impairment of long-lived assets***

The Company evaluates long-lived assets for potential impairment when events or changes in circumstances indicate the carrying value of the assets may not be recoverable. Determination of recoverability is based on an estimate of undiscounted future cash flows resulting from the use of the asset and its eventual disposition. In the event that such cash flows are not expected to be sufficient to recover the carrying amount of the asset, the assets are written down to their estimated fair values. Long-lived assets to be disposed are reported at the lower of the carrying amount or fair value less cost to sell.

***Deferred financing costs***

The Company records debt issuance costs as a reduction to the related debt's carrying value and amortizes these costs over the life of the debt using the effective interest rate method.

***Fair value of financial instruments***

The Company has certain financial assets and liabilities recorded at fair value which have been classified as Level 1, 2 or 3 within the fair value hierarchy as described in the accounting standards for fair value measurements.

- Level 1—Fair values are determined by utilizing quoted prices (unadjusted) in active markets for identical assets or liabilities that the Company has the ability to access;
- Level 2—Fair values are determined by utilizing quoted prices for similar assets and liabilities in active markets or other market observable inputs such as interest rates, yield curves and foreign currency spot rates; and

- Level 3—Prices or valuations that require inputs that are both significant to the fair value measurement and unobservable.

The Company's financial assets consist of cash equivalents and the Company's financial liabilities consist of warrant liabilities.

The fair value of the Company's cash equivalents is determined using quoted prices in active markets. The Company's cash equivalents consist of money market funds that are classified as Level 1.

The fair value of the Company's warrant liabilities is determined using a Monte Carlo simulation. The Company remeasures the fair value of its liability-classified warrants at each reporting date. The Monte Carlo simulation requires the input of assumptions, including the Company's stock price, the volatility of its stock price, remaining term in years, expected dividend yield, and risk-free rate. In addition, the valuation model considers our probability of being acquired during each annual period within the terms of the liability-classified warrants, as an acquisition event can potentially impact the settlement. Changes to the assumptions used in determining the fair value of the Company's liability-classified warrants could result in materially different fair values for these warrant liabilities. See **Note 10. Warrants** for assumptions used to calculate the estimated fair value of the Company's warrant liabilities. The Company's warrant liabilities are classified as Level 3.

***Leases***

At the inception of the contract, the Company determines if an arrangement is a lease and has a lease term greater than 12 months. The Company has elected not to recognize on the balance sheet leases that, at the commencement date, have a lease term of twelve months or less and do not include a purchase option that the Company is reasonably certain to exercise. These short-term leases are expensed on a straight-line basis over the lease term. A lease qualifies as a finance lease if any of the following criteria are met at the inception of the lease: (i) there is a transfer of ownership of the leased asset to the Company by the end of the lease term, (ii) the Company holds an option to purchase the leased asset that it is reasonably certain to exercise, (iii) the lease term is for a major part of the remaining economic life of the leased asset, (iv) the present value of the sum of lease payments equals or exceeds substantially all of the fair value of the leased asset, or (v) the nature of the leased asset is specialized to the point that it is expected to provide the lessor no alternative use at the end of the lease term. All other leases are recorded as operating leases and are included in right-of-use ("ROU") assets and lease liabilities in the consolidated balance sheets.

ROU assets represent the Company's right to use an underlying asset for the lease term and lease liabilities represent the Company's obligation to make lease payments arising from the lease. ROU assets and liabilities are recognized at the lease commencement date based on the present value of lease payments over the lease term. As most of the Company's leases do not provide an implicit rate, the Company uses an estimate of its incremental borrowing rate based on the information available at the lease commencement date in determining the present value of lease payments. The Company uses the implicit rate when readily determinable. The operating lease ROU asset is reduced by deferred lease payments and unamortized lease incentives. The Company's lease terms may include options to extend or terminate the lease when it is reasonably certain that the Company will exercise that option. Lease expense for fixed lease payments on operating leases are recognized over the expected term on a straight-line basis, while lease expense for fixed lease payments on financing leases are recognized using the effective interest method over the lease term. The Company has lease agreements with lease and non-lease components, which are generally accounted for separately. The non-lease components generally consist of common area maintenance that is expensed as incurred.

***Research and development expenses***

Research and development costs are expensed as incurred. Research and development expenses include fees paid to CROs in connection with clinical trials, CMOs with respect to preclinical and clinical materials and intermediaries, and vendors in connection with preclinical development activities. Nonrefundable advanced payments for goods or services to be received in the future for use in research and development activities are deferred and capitalized. The capitalized amounts are expensed as the related goods are delivered or the services are performed or when the goods have been received rather than when the payment is made. The Company conducts a thorough review of open contracts and purchase orders as well as an evaluation by internal personnel to identify services received that have been performed in order to establish an estimate for the associated cost incurred for these services for which it has not yet been invoiced or otherwise notified of the actual cost. The majority of Genocea's service providers invoice the Company monthly in arrears for services performed or when contractual milestones are met. Genocea makes estimates of its accrued research and development expenses as of each balance sheet date in the consolidated financial statements based on facts and circumstances known to it at that time. The Company periodically confirms the accuracy of its estimates with the service providers and make adjustments, if necessary.

The Company bases its expenses related to clinical trials on its estimates of the services performed pursuant to contracts with clinical sites that conduct clinical trials 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. Payments under some of these contracts depend on factors such as the successful enrollment of patients and the completion of required data submission. In recording service fees, the Company makes estimates based upon the time period over which services will be performed or other observable and measurable progress points as defined in the contracts, such as number of patients enrolled, number of sites, or extent of services performed in each period. The calculated amount of service fee expense is compared to the actual payments made pursuant to the contract's billing schedule to determine the resulting prepaid or accrual position. If Genocea's estimates of the status and timing of services performed differs from the actual status and timing of services performed, the Company may report amounts that are too high or too low in any particular period. To date, there has been no material differences from the Company's estimates to the amount incurred.

***Stock-based compensation expense***

The Company recognizes stock-based compensation expense for stock-based awards, including grants of stock options and restricted stock units ("RSUs"), over the requisite service period based on the estimated fair value on the grant date. The Company calculates the fair value of its stock options using the Black-Scholes option pricing model. The fair value of the RSUs is the closing market price of Genocea's common stock on the grant date. Forfeitures are recorded as they occur.

***Income taxes***

The Company accounts for income taxes under the asset and liability method. Under this method, deferred tax assets and liabilities are recognized for the estimated future tax consequences attributable to differences between the financial statement carrying amounts of existing assets and liabilities and their respective tax basis. Deferred tax assets and liabilities are measured using the enacted tax rates in effect for the year in which these temporary differences are expected to recovered or settled. Valuation allowances are provided if, based on the weight of available evidence, it is more likely than not that some or all of the deferred tax assets will not be realized.

***Basic and diluted net loss per share***

Basic net loss per share is computed by dividing the net loss by the weighted average number of common shares outstanding for the period. Diluted net loss per share is computed by dividing the net loss, adjusted for the remeasurement to fair value for the warrants that were issued in connection with the 2020 private placement as they are both liability-classified and in-the-money, by the weighted average number of common shares outstanding during the period, adjusted for the dilutive effect of shares of common stock equivalents resulting from warrants as determined using the treasury stock method.

***New Accounting Pronouncements***

The following new accounting pronouncements were adopted by the Company on January 1, 2020:

In 2016, the Financial Accounting Standards Board ("FASB") issued ASU 2016-13, *Financial Instruments-Credit Losses (Topic 326): Measurement of Credit Losses on Financial Instruments* ("ASU 2016-13"), which amends the impairment model by requiring entities to use a forward-looking approach based on expected losses to estimate credit losses on certain types of financial instruments, including trade receivables and available-for-sale debt securities. The Company early adopted the standard on January 1, 2020. Based on the composition of the Company's investment portfolio, which includes only money market funds, and the insignificance of the Company's other financial assets, current market conditions, and historical credit loss activity, the adoption of this standard did not have a material impact on the Company's consolidated financial statements and related disclosures.

In 2018, the FASB issued ASU 2018-13, *Fair Value Measurement (Topic 820): Disclosure Framework – Changes to the Disclosure Requirements for Fair Value Measurement* ("ASU 2018-13"). The new standard requires public entities to disclose certain new information and modifies some disclosure requirements. The Company adopted the standard on the required effective date of January 1, 2020. This standard did not have a material impact on the Company's disclosures.

In 2018, the FASB issued ASU 2018-15, *Intangibles-Goodwill and Other-Internal-Use Software (Subtopic 350-40)*: *Customer's Accounting for Implementation Costs Incurred in a Cloud Computing Arrangement That Is a Service Contract* ("ASU 2018-15"). ASU 2018-15 requires a customer in a cloud computing arrangement that is a service contract to follow the internal-use software guidance in Accounting Standards Codification 350-40 to determine which implementation costs to defer and recognize as an asset. The Company adopted the standard on a prospective basis on the required effective date of January 1, 2020. This standard did not have a material impact on the Company's consolidated financial statements and related disclosures.

The following new accounting pronouncement has been issued but is not yet effective as of December 31, 2020:

In 2019, the FASB issued ASU 2019-12, *Income Taxes (Topic 740): Simplifying the Accounting for Income Taxes* ("ASU 2019-12"). ASU 2019-12 simplifies the accounting for income taxes and will be effective beginning after December 15, 2020. The Company will adopt this standard on January 1, 2021. The adoption of this standard is not expected to have a material impact on the Company's consolidated financial statements and related disclosures.

**3. Revenue**

In May 2020, the Company entered into a material transfer agreement (the "MTA") with Shionogi & Co., Ltd. ("Shionogi"), a Japanese corporation, pursuant to which the Company agreed to transfer certain HSV-2 antigens from its GEN-003 program to Shionogi to evaluate the potential development of a novel HSV-2 vaccine. In connection with the agreement, the Company provided Shionogi with an option to negotiate an exclusive development and commercialization license for the HSV-2 antigens.

Under the terms of the MTA, Shionogi paid the Company a total of $3.0 million in non-refundable, creditable (with respect to the up-front fee pursuant to a development and commercialization agreement) fees. Prior to the expiration of the MTA, Shionogi has the option to negotiate a development and commercialization agreement. If executed, the terms of the development and commercialization agreement are expected to include an upfront payment, regulatory and sales milestones, and tiered royalties. Final terms of the development and commercialization agreement will be based on evaluation of the HSV-2 assets and overall diligence. If licensed, Shionogi will assume responsibility for global development and commercialization of an HSV-2 vaccine product.

Management evaluated the promised goods and services within the MTA and determined those which represented separate performance obligations. As a result, management concluded there were two separate performance obligations at the inception of the MTA: (i) a combined performance obligation consisting of a limited use research license and the delivery of the initial antigen materials and (ii) the right to negotiate a license prior to expiration of the MTA, which was deemed to be a material right. The Company determined that the exclusive limited use research license and the delivery of the initial antigen materials should be combined as they are not capable of being distinct. A third party would not be able to provide the initial antigen materials as it contains the Company's proprietary intellectual property and Shionogi could not benefit from the research license without the initial antigen materials. The Company determined that the option to negotiate the development and commercialization agreement prior to the expiration of the MTA is a material right. The $3.0 million fee associated with the MTA is creditable against the upfront fee for the development and commercialization agreement and represents a discount that would otherwise not be available to the customer without entering into the MTA.

The Company estimated the standalone selling price of the initial antigen materials based on the expected cost plus a margin approach. The Company developed its standalone selling price for the material right by applying a probability-weighted likelihood that Shionogi will exercise its option to license the HSV-2 assets.

At inception, the transaction price was comprised of fixed and variable consideration. However, in the three months ended September 30, 2020, the Company determined a constraint was no longer required on the variable consideration. As a result, the Company revised its initial relative selling price analysis to include the variable consideration, resulting in a total transaction price of $3.0 million.

The initial amount allocated to the limited use research license and the delivery of the initial antigen materials, or $0.9 million, was recognized upon delivery of the materials to Shionogi in the quarter ended June 30, 2020. In the quarter ended September 30, 2020, the Company recorded an additional $0.5 million of license revenue attributable to the variable consideration being included in the transaction price. The $1.6 million allocated to the material right is considered a contract liability and is recorded as deferred revenue on the Company's consolidated balance sheet. Revenue associated with the material right will be recognized upon either (i) the execution of a development and commercialization agreement or (ii) the termination of the MTA.

**4. Fair value of financial instruments**

The following table sets forth the Company's assets and liabilities that are measured at fair value on a recurring basis as of December 31, 2020 and 2019 (in thousands):

| | Total | Quoted prices in active markets (Level 1) | Significant other observable inputs (Level 2) | Significant unobservable inputs (Level 3) |
|---|---|---|---|---|
| **December 31, 2020** | | | | |
| **Assets** | | | | |
| Cash equivalents | 76,866 | 76,866 | — | — |
| Total assets | $ 76,866 | $ 76,866 | $ — | $ — |
| **Liabilities** | | | | |
| Warrant liabilities | 56,118 | — | — | 56,118 |
| Total liabilities | $ 56,118 | $ — | $ — | $ 56,118 |
| | | | | |
| **December 31, 2019** | | | | |
| **Assets** | | | | |
| Cash equivalents | 39,971 | 39,971 | — | — |
| Total assets | $ 39,971 | $ 39,971 | $ — | $ — |
| **Liabilities** | | | | |
| Warrant liabilities | 2,486 | — | — | 2,486 |
| Total liabilities | $ 2,486 | $ — | $ — | $ 2,486 |

The following table reflects the change in the Company’s Level 3 warrant liabilities (in thousands):

| | Warrant liabilities |
|---|---|
| **Balance at December 31, 2018** | $ 3,472 |
| Change in fair value | (986) |
| **Balance at December 31, 2019** | $ 2,486 |
| Issuance of Warrants | 62,521 |
| Change in fair value | (8,889) |
| **Balance at December 31, 2020** | $ 56,118 |

**5. Property and equipment, net**

Property and equipment, net consist of the following (in thousands):

| | December 31 | |
|---|---|---|
| | 2020 | 2019 |
| Laboratory equipment | $ 3,905 | $ 4,125 |
| Internally developed software | 3,364 | 2,547 |
| Leasehold improvements | 3,268 | 1,524 |
| Furniture and office equipment | 1,006 | 456 |
| Computer hardware | 355 | 338 |
| Construction and internally developed software in progress | 612 | 97 |
| Total property and equipment | 12,510 | 9,087 |
| Accumulated depreciation and amortization | (7,387) | (6,470) |
| Property and equipment, net | $ 5,123 | $ 2,617 |

Depreciation expense was $0.5 million and $0.7 million for 2020 and 2019, respectively. Amortization related to the Company's internally developed software was $0.6 million and $0.4 million for 2020 and 2019, respectively. All of the Company's long-lived assets are located in the U.S.

**6. Accrued expenses and other current liabilities**

Accrued expenses and other current liabilities consisted of the following (in thousands):

| | December 31 | |
|---|---|---|
| | 2020 | 2019 |
| Payroll and employee-related costs | $ 2,779 | $ 2,245 |
| Research and development costs | 2,592 | 1,607 |
| Other current liabilities | 1,973 | 759 |
| Total | $ 7,344 | $ 4,611 |

**7. Commitments and contingencies**

***Operating Leases***

As of December 31, 2020, the Company leased two floors of lab and office space in a multi-tenant building in Cambridge, Massachusetts through February 2025. A portion of this leased space is an expansion of the Company's initial lease. Genocea's right to use and control this expansion space began in March 2020. As a result, the Company recognized an increase in its ROU assets of $5.9 million and associated lease liabilities of $5.8 million in the first quarter of 2020. The Company has the option to extend the lease term for an additional five years, which is not included in the Company's ROU assets and associated lease liabilities as of December 31, 2020. In the fourth quarter of 2020, Genocea incurred costs related to improvements made to its leased office space that were determined to be lessee assets. These costs will be partially reimbursed by the lessor. The Company recognized a decrease in its ROU assets of $1.2 million, which reflects the amount approved to be reimbursed by the lessor, and a decrease in its lease liabilities of $0.5 million, which reflects the approved reimbursement amount net of cash received from the lessor as of December, 31, 2020. The Company will amortize the reimbursement as an increase to the ROU asset and a reduction in lease expense over the remaining lease term.

In January 2021, the Company entered into a sublease agreement for one floor of lab and office space through June 2022, with an option for the sublessee to extend the sublease for an additional two months. After the initial option, which is at the sublessee’s sole discretion, the sublease agreement contains additional options for the Company and the sublessee to mutually extend the sublease for up to an additional eighteen months. As the Company retained its obligations under the sublease, the Company will record the payments received from the sublease as a reduction of lease expense.

Lease expense, net of sublease income, was $2.8 million and $1.5 million for 2020 and 2019, respectively.

The weighted average remaining lease term and weighted average discount rate of the Company's operating leases are as follows:

| | December 31 | |
|---|---|---|
| | 2020 | 2019 |
| Weighted average remaining lease term in years | 4.17 | 5.12 |
| Weighted average discount rate | 8.12 % | 8.27 % |

***Finance Lease***

In December 2019, the Company entered into an agreement to lease lab equipment for a term of 15 months. The Company determined that the agreement qualifies as a finance lease based on the criteria that the Company holds the option to purchase the asset and is reasonably certain to exercise at the end of the lease term. The ROU asset and lease liability were calculated using an incremental borrowing rate of 7.95%. Lease payments on this lease began in January 2020.

The following table summarizes the presentation in the Company's consolidated balance sheets (in thousands):

| Leases (in thousands) | Classification | December 31 2020 | December 31 2019 |
|---|---|---|---|
| **Assets** | | | |
| Operating | Right of use assets | $ 9,278 | $ 6,156 |
| Finance | Right of use assets | 30 | 150 |
| Total leased assets | | $ 9,308 | $ 6,306 |
| **Liabilities** | | | |
| Current: | | | |
| Operating | Lease liabilities | $ 1,592 | $ 990 |
| Finance | Lease liabilities | 22 | 127 |
| Non-current: | | | |
| Operating | Lease liabilities, net of current portion | 8,398 | 5,373 |
| Finance | Lease liabilities, net of current portion | — | 22 |
| Total lease liabilities | | $ 10,012 | $ 6,512 |

The minimum lease payments related to the Company's operating and finance leases as of December 31, 2020 were as follows (in thousands):

| | Operating | Finance | Total |
|---|---|---|---|
| 2021 | $ 2,365 | $ 22 | $ 2,387 |
| 2022 | 2,943 | — | 2,943 |
| 2023 | 3,017 | — | 3,017 |
| 2024 | 3,092 | — | 3,092 |
| 2025 and thereafter | 517 | — | 517 |
| Total lease payments | $ 11,934 | $ 22 | $ 11,956 |
| Less imputed interest | (1,944) | — | (1,944) |
| Total | $ 9,990 | $ 22 | $ 10,012 |

At December 31, 2020 and 2019, the Company has an outstanding letter of credit of $0.6 million with a financial institution related to a security deposit for the office and lab space lease, which is secured by cash on deposit and expires in February 2025.

***Contractual obligations***

The Company has entered into certain agreements with various contract research organizations ("CROs") and contract manufacturing organizations ("CMOs"), which generally include cancellation clauses.

*Harvard University License Agreement*

The Company has an exclusive license agreement with Harvard University (“Harvard”), granting the Company an exclusive, worldwide, royalty-bearing, sublicensable license to three patent families, to develop, make, have made, use, market, offer for sale, sell, have sold and import licensed products and to perform licensed services related to the ATLAS discovery platform. The Company is also obligated to pay Harvard milestone payments up to $1.6 million in the aggregate upon the achievement of certain development and regulatory milestones. As of December 31, 2020, the Company has paid $0.3 million in aggregate milestone payments. The Company is obligated under this license agreement to use commercially reasonable efforts to develop, market and sell licensed products in compliance with an agreed upon development plan. In addition, the Company is obligated to achieve specified development milestones and in the event the Company is unable to meet its development milestones for any type of product or service, absent any reasonable proposed extension or amendment thereof, Harvard has the right, depending on the type of product or service, to terminate this agreement with respect to such products or to convert the license to a non-exclusive, non-sublicensable license with respect to such products and services.

Upon commercialization of our products covered by the licensed patent rights or discovered using the licensed methods, the Company is obligated to pay Harvard royalties on the net sales of such products and services sold by the Company, the Company's affiliates, and the Company's sublicensees. This royalty varies depending on the type of product or service but is in the low single digits. The sales-based royalty due by the Company's sublicensees is the greater of the applicable royalty rate or a percentage in the high single digits or the low double digits of the royalties the Company receives from such sublicensee, depending on the type of product. Based on the type of commercialized product or service, royalties are payable until the expiration of the last-to-expire valid claim under the licensed patent rights or for a period of 10 years from first commercial sale of such product or service. The royalties payable to Harvard are subject to reduction, capped at a specified percentage, for any third-party payments required to be made. In addition to the royalty payments, if the Company receives any additional revenue (cash or non-cash) under any sublicense, the Company must pay Harvard a percentage of such revenue, excluding certain categories of payments, varying from the low single digits to up to the low double digits depending on the scope of the license that includes the sublicense.

The license agreement with Harvard will expire on a product-by-product or service-by-service and country-by-country basis until the expiration of the last-to-expire valid claim under the licensed patent rights. The Company may terminate the agreement at any time by giving Harvard advance written notice. Harvard may also terminate the agreement in the event of a material breach by the Company that remains uncured; in the event of our insolvency, bankruptcy, or similar circumstances; or if the Company challenges the validity of any patents licensed to us.

*Oncovir License and Supply Agreement*

In January 2018, the Company entered into a License and Supply Agreement with Oncovir, Inc. ("Oncovir"). The agreement provides the terms and conditions under which Oncovir will manufacture and supply an immunomodulator and vaccine adjuvant, Hiltonol® (poly-ICLC) ("Hiltonol"), to the Company for use in connection with the research, development, use, sale, manufacture, commercialization and marketing of products combining Hiltonol with the Company's technology (the "Combination Product"). Hiltonol is the adjuvant component of GEN-009, which will consist of synthetic long peptides or neoantigens identified using the Company's proprietary ATLAS platform, formulated with Hiltonol.

Oncovir granted the Company a non-exclusive, assignable, royalty-bearing worldwide license, with the right to grant sublicenses through one tier, to certain of Oncovir's intellectual property in connection with the research, development, or commercialization of Combination Products, including the use of Hiltonol, but not the use of Hiltonol for manufacturing or the use or sale of Hiltonol alone. The license will become perpetual, fully paid-up, and royalty-free on the later of January 25, 2028 or the date on which the last valid claim of any patent licensed to the Company under the agreement expires.

Under this agreement, the Company is obligated to pay Oncovir low to mid six figure milestone payments upon the achievement of certain clinical trial milestones for each Combination Product and the first marketing approval for each Combination Product in certain territories, as well as tiered royalties in the low-single digits on a product-by-product basis based on the net sales of Combination Products.

The Company may terminate the agreement upon a decision to discontinue the development of the Combination Product or upon a determination by the Company or an applicable regulatory authority that Hiltonol or a Combination Product is not clinically safe or effective. The agreement may also be terminated by either party due to a material uncured breach by the other party, or due to the other party's bankruptcy, insolvency, or dissolution.

**8. Debt**

In April 2018, the Company entered into an amended and restated loan and security agreement with Hercules Capital, Inc. ("Hercules"), which was subsequently amended in November 2019 (as amended, the "2018 Term Loan"). The 2018 Term Loan provides a $14.0 million term loan. The 2018 Term Loan matures on May 1, 2021 and accrues interest at a floating rate per annum equal to the greater of (i) 8.00%, or (ii) the sum of 3.00% plus the prime rate. The 2018 Loan Agreement provides for interest-only payments until January 1, 2021. Thereafter, payments will include equal installments of principal and interest through maturity. The 2018 Term Loan may be prepaid subject to a prepayment charge. The Company is obligated to pay an end of term charge of $1.0 million at maturity. The Company evaluated the November 2019 amendment to the 2018 Term Loan and concluded that it was a modification of the existing loan agreement.

The 2018 Term Loan is secured by a lien on substantially all assets of the Company, other than intellectual property. Hercules has a perfected first-priority security interest in certain cash, cash equivalents and investment accounts. The 2018 Term Loan contains non-financial covenants, representations and a Material Adverse Effect provision, as defined herein. There are no financial covenants. A "Material Adverse Effect" means a material adverse effect upon: (i) the business, operations, properties, assets or condition (financial or otherwise) of the Company; (ii) the ability of the Company to perform the secured obligations in accordance with the terms of the loan documents, or the ability of agent or lender to enforce any of its rights or remedies with respect to the secured obligations; or (iii) the collateral or agent's liens on the collateral or the priority of such liens. Any event that has a Material Adverse Effect or would reasonably be expected to have a Material Adverse Effect is an event of default under the Loan Agreement and repayment of amounts due under the Loan Agreement may be accelerated by Hercules under the same terms as an event of default. As of December 31, 2020, the Company was in compliance with all covenants of the 2018 Term Loan. The 2018 Term Loan is automatically redeemable upon a change in control. As of December 31, 2020, $13.9 million of the Company's outstanding borrowings is classified as a current liability.

In connection with the 2018 Term Loan, the Company issued common stock warrants to Hercules (the "Hercules Warrant"). See **Note 10. Warrants**.

As of December 31, 2020 and 2019, the Company's total debt on the consolidated balance sheets was $13.9 million and $13.4 million, respectively. The Company made no payments on its long term debt during 2020 and repaid $1.9 million during 2019. Interest expense was $1.5 million and $1.6 million in 2020 and 2019, respectively.

Future principal payments of $14.0 million, including the end of term charges, are due in 2021 on the 2018 Term Loan.

**9. Stockholders' equity**

Effective June 2, 2020, the Company increased the number of authorized shares of common stock from 85 million shares to 170 million shares.

***2020 Private Placement***

In July 2020, the Company completed a private placement (the "2020 Private Placement") and received net cash proceeds of $74.5 million. In connection with the 2020 Private Placement, the Company issued approximately 21.4 million shares of its common stock, pre-funded warrants to purchase approximately 12.2 million additional shares of its common stock (the "2020 Pre-Funded Warrants") and warrants to purchase approximately 33.6 million shares of its common stock (the "2020 Warrants"). See **Note 10. Warrants**.

In connection with the 2020 Private Placement, the Company incurred $5.4 million of issuance costs. The Company allocated $1.2 million of the issuance costs to the common stock and 2020 Pre-Funded Warrants within additional paid-in capital and immediately expensed $4.2 million of the issuance costs allocated to the liability-classified 2020 Warrants as other expenses.

***Agreement with Lincoln Park Capital***

In October 2019, the Company entered into a purchase agreement with Lincoln Park Capital ("LPC") pursuant to which LPC purchased $2.5 million of shares of the Company's common stock at a purchase price of $2.587 per share. In addition, for a period of 30 months, the Company has the right, at its sole discretion, to sell up to an additional $27.5 million of the Company's common stock based on prevailing market prices of its common stock at the time of each sale. In consideration for entering into the purchase agreement, the Company issued approximately 0.3 million shares of its common stock to LPC as a commitment fee. The purchase agreement limits the Company's sales of shares of common stock to LPC to approximately 5.2 million shares of common stock, representing 19.99% of the shares of common stock outstanding on the date of the purchase agreement. The purchase agreement also prohibits the Company from directing LPC to purchase any shares of common stock if those shares, when aggregated with all other shares of the Company's common stock then beneficially owned by LPC and its affiliates, would result in LPC and its affiliates having beneficial ownership, at any single point in time, of more than 9.99% of the then total outstanding shares of the Company's common stock. In 2020, the Company sold approximately 1.5 million shares of common stock resulting in $3.5 million of net proceeds. As of December 31, 2020, the Company had $24.0 million remaining under its agreement with LPC.

***At-the-market equity offering program***

In 2015, the Company entered into an agreement, as amended, with Cowen and Company, LLC to establish an at-the-market equity offering program ("ATM") pursuant to which it was able to offer and sell up to $50.0 million of the Company's common stock at prevailing market prices. In 2020, the Company sold approximately 2.4 million shares under the ATM program and received net proceeds of $5.8 million, after deducting commissions. No shares were sold under the ATM program in 2019. Through December 31, 2020, the Company has sold an aggregate of approximately 2.9 million shares under the ATM and received $9.8 million in net proceeds. As of December 31, 2020, the Company had $39.9 million in gross proceeds remaining under the ATM.

***Preferred Stock***

In July 2020, 1,635 shares of the Company's preferred stock, which represented the entirety of the outstanding preferred stock balance, were converted to common stock. Each share of preferred stock was convertible into 125 shares of common stock.

***2019 Public Offering***

In June 2019, the Company completed an underwritten public offering (the "2019 Public Offering") in which it received net proceeds of $38.4 million and issued approximately 12.1 million shares of the Company's common stock. The Company incurred $3.9 million of offering-related expenses for the 2019 Public Offering.

***2019 Private Placement***

In February 2019, the Company completed a private placement (the "2019 Private Placement") and received net cash proceeds of $13.8 million. In connection with the 2019 Private Placement, the Company issued approximately 3.2 million shares of common stock, pre-funded warrants to purchase approximately 0.5 million shares of common stock (the "2019 Pre-Funded Warrants"), and warrants to purchase up to approximately 0.9 million shares of common stock (the "2019 Warrants"). See **Note 10. Warrants**.

**10. Warrants**

As of December 31, 2020, the Company had the following potentially issuable shares of common stock related to unexercised warrants outstanding (shares in thousands):

| | Shares | Exercise price | Expiration date | Classification |
|---|---|---|---|---|
| Hercules Warrant | 41 | $ 6.80 | Q2 2023 | Equity |
| 2018 Warrants | 3,617 | $ 9.60 | Q1 2023 | Liability |
| 2019 Warrants | 933 | $ 4.52 | Q1 2024 | Equity |
| 2019 Pre-Funded Warrants | 531 | $ 0.08 | Q1 2039 | Equity |
| 2020 Warrants | 33,613 | $ 2.25 | Q3 2024 | Liability |
| 2020 Pre-Funded Warrants | 12,223 | $ 0.01 | | Equity |
| | 50,958 | | | |

***Hercules Warrant***

The exercise price and the number of shares are subject to adjustment upon a merger event, reclassification of the shares of common stock, subdivision or combination of the shares of common stock or certain dividends payments. The Company determined that the Hercules Warrant should be equity-classified for all periods presented.

***2018 Warrants***

In 2018, the Company completed a public offering of approximately 6.7 million shares of the Company's common stock and accompanying warrants to purchase up to approximately 3.3 million shares of common stock ("2018 Warrants"). The exercise price and the number of shares are subject to adjustment upon a merger event, reclassification of the shares of common stock, subdivision or combination of the shares of common stock or certain dividends payments. In the event of an "Acquisition", defined generally to include a merger or consolidation resulting in the sale of 50% or more of the voting securities of the Company, the sale of all or substantially all, of the assets or voting securities of the Company, or other change of control transaction, as defined in the 2018 Warrants, the Company will be obligated to use its best efforts to ensure that the holders of the 2018 Warrants receive new warrants from the surviving or acquiring entity (the "Acquirer"). The new warrants to purchase shares in the Acquirer shall have the same expiration date as the 2018 Warrants and a strike price that is based on the proportion of the value of the Acquirer's stock to the Company's common stock. If the Company is unable, despite its best efforts, to cause the Acquirer to issue new warrants in the Acquisition as described above, then, if the Company's stockholders are to receive cash in the Acquisition, the Company will settle the 2018 Warrants in cash and if the Company's stockholders are to receive stock in the Acquisition, the Company will issue shares of its common stock to each Warrant holder.

The Company determined that the 2018 Warrants should be liability-classified for all periods presented. As the 2018 Warrants are liability-classified, the Company remeasures the fair value at each reporting date. The Company initially recorded the 2018 Warrants at their estimated fair value of $18.2 million. In connection with the Company's remeasurement of the 2018 Warrants to fair value, the Company recorded income of $0.8 million and $1.0 million during 2020 and 2019, respectively. The fair value of the warrant liability related to the 2018 Warrants is $1.7 million and $2.5 million as of December 31, 2020 and 2019, respectively.

The following table details the assumptions used in the Monte Carlo simulation models used to estimate the fair value of the 2018 Warrants as of December 31, 2020 and 2019, respectively:

| | December 31 | |
|---|---|---|
| | 2020 | 2019 |
| Stock Price | $ 2.42 | $ 2.07 |
| Volatility | 50.0% - 101.5% | 50.0% - 116.6% |
| Remaining term (in years) | 2.0 | 3.1 |
| Expected dividend yield | — % | — % |
| Risk-free rate | 0.13 % | 1.62 % |
| Annual acquisition event probability | 25.0 % | 20.0 % |

***2019 Warrants and 2019 Pre-Funded Warrants***

The exercise price of the warrants is subject to appropriate adjustment in the event of stock dividends, subdivisions, stock splits, stock combinations, reclassifications, reorganizations or a change of control affecting our common stock. The Company determined that the 2019 Warrants and the 2019 Pre-Funded Warrants should be equity-classified for all periods presented. The Company also determined that the 2019 Pre-Funded Warrants should be included in the determination of basic earnings per share.

***2020 Warrants and 2020 Pre-Funded Warrants***

In July 2020, in connection with the 2020 Private Placement, the Company issued common stock, 2020 Pre-Funded Warrants and 2020 Warrants. The exercise price of the 2020 Pre-Funded Warrants and the 2020 Warrants is subject to adjustment in the event of stock dividends, subdivisions, stock splits, stock combinations, reclassifications, reorganizations or a change of control affecting the Company's common stock. The Company determined that the 2020 Pre-Funded Warrants should be equity-classified. The Company also determined that the 2020 Pre-Funded Warrants should be included in the determination of basic earnings per share.

The holders of the 2020 Warrants are entitled to down round protection until July 24, 2021. For one year after the closing of the 2020 Private Placement, the Company is required to obtain shareholder approval for the adjustment to the exercise price as a result of any common stock issuance at a price per share less than $2.25. As a result, the Company determined that the 2020 Warrants should be liability-classified for the period from issuance through July 2021. As the 2020 Warrants are liability-classified, the Company remeasures the fair value at each reporting date. The Company initially recorded the 2020 Warrants at their estimated fair value of $62.5 million. In connection with the Company's remeasurement of the 2020 Warrants to fair value, the Company recorded income of $8.1 million during 2020. The fair value of the warrant liability related to the 2020 Warrants is $54.5 million as of December 31, 2020.

The following table details the assumptions used in the Monte Carlo simulation models used to estimate the fair value of the 2020 Warrants as of December 31, 2020 and the issuance date, respectively:

| | December 31, 2020 | Issuance Date |
|---|---|---|
| Stock price* | $ 2.42 | $ 2.69 |
| Volatility | 119.1 % | 110.6 % |
| Remaining term (in years) | 3.6 | 4.0 |
| Expected dividend yield | — % | — % |
| Risk-free rate | 0.22 % | 0.22 % |
| Annual acquisition event probability | 40.0 % | 40.0 % |

*The stock price input at the issuance date was adjusted to reflect a discount for lack of marketability.

**11. Employee benefit plans**

Genocea grants stock options and time-based RSUs to employees and directors of, and consultants and advisors to, the Company through its Amended and Restated 2014 Equity Incentive Plan, ("2014 Equity Incentive Plan"). It is the only equity incentive plan under which the Company may grant equity awards. In June 2020, the Company's stockholders approved an increase of 2.8 million shares to the 2014 Equity Incentive Plan. As of December 31, 2020, approximately 2.6 million shares were available for future grants.

The 2014 Equity Incentive Plan provides that the number of shares available for issuance will automatically increase annually on each January 1, in amount equal to the lesser of 4.0% of the outstanding shares of the Company's outstanding common stock as of the close of business on the immediately preceding December 31 or the number of shares determined the Company's board of directors. On January 1, 2021, the total number of shares available for issuance under the 2014 Equity Incentive Plan increased by approximately 2.1 million shares under this provision.

The options have a ten-year term and were issued with an exercise price equal to the closing market price of Genocea's common stock on the grant date. The options and RSUs generally vest over a four-year period.

***Determining the Fair Value of Stock Options***

The Company measures the fair value of stock options on the date of grant using the Black-Scholes option pricing model. The Company had historically estimated its expected volatility using a weighted average of publicly traded peer companies and the volatility of its own common stock, as the Company did not have sufficient history to support a calculation of volatility and expected term using only its historical data. Effective January 1, 2020, the Company's own trading history is sufficient to support the expected volatility of its equity awards granted. This change in method of determining expected volatility has been applied to all awards granted in 2020. The expected dividend yield was based on the Company's expectation of not paying dividends in the foreseeable future. The expected term was determined using the simplified method described by Securities and Exchange Commission Staff Accounting Bulletin 110, which reflects the anticipated time period between the measurement date and the mid-point between the vesting date and the end of the contractual term. The Company uses the simplified method because it believes historical exercise data may not provide a reasonable basis upon which to estimate expected term due to a significant strategic shift in 2017. The Company will continue to assess the appropriateness of the use of the simplified method as it develops a history of option exercises after the strategic shift. The risk-free interest rate is determined by reference to implied yields available from U.S. Treasury securities with a remaining term equal to the expected term assumed at the grant date.

The weighted-average assumptions used in the Black-Scholes option-pricing model are as follows:

| | Years Ended December 31 | |
|---|---|---|
| | 2020 | 2019 |
| Expected volatility | 104.4 % | 79.7 % |
| Risk-free interest rate | 0.5 % | 2.3 % |
| Expected term (in years) | 6.0 | 6.0 |
| Expected dividend yield | — % | — % |

***Stock-based compensation expense***

Total stock-based compensation expense recognized for stock options and RSUs is as follows (in thousands):

| | Years Ended December 31 | |
|---|---|---|
| | 2020 | 2019 |
| Research and development | $ 832 | $ 725 |
| General and administrative | 1,142 | 1,112 |
| Total | $ 1,974 | $ 1,837 |

***Stock options***

The following table summarizes stock option activity (shares and aggregate intrinsic value in thousands):

| | Shares | Weighted-Average Exercise Price | Weighted-Average Remaining Contractual Term (years) | Aggregate Intrinsic Value |
|---|---|---|---|---|
| **Outstanding at December 31, 2019** | 1,323 | $ 11.65 | | $ — |
| Granted | 1,345 | $ 2.09 | | |
| Exercised | (4) | $ 1.66 | | |
| Canceled | (335) | $ 5.28 | | |
| **Outstanding at December 31, 2020** | 2,329 | $ 7.05 | 8.2 | $ 505 |
| **Exercisable at December 31, 2020** | 887 | $ 13.61 | 6.9 | $ 74 |

During 2020 and 2019, the Company granted stock options to purchase an aggregate of approximately 1.3 million and 0.7 million shares of its common stock, respectively, with weighted-average grant date fair values of $2.09 and $4.36, respectively.

As of December 31, 2020, there was $2.9 million of total unrecognized compensation cost related to stock options granted under the 2014 Equity Incentive Plan. The Company expects to recognize that cost over a remaining weighted-average period of 2.5 years.

***RSUs***

The following table summarizes RSU activity (shares in thousands):

| | Shares | Weighted-Average Grant Date Fair Value |
|---|---|---|
| **Outstanding as of December 31, 2019** | — | $ — |
| Granted | 620 | $ 2.11 |
| Vested | — | $ — |
| Forfeited/cancelled | (70) | $ 1.95 |
| **Outstanding as of December 31, 2020** | 550 | $ 2.13 |

As of December 31, 2020, there was $1.0 million of total unrecognized compensation cost related to RSUs granted under the 2014 Equity Incentive Plan. The Company expects to recognize that cost over a remaining weighted-average period of 3.4 years.

***Employee Stock Purchase Plan***

In February 2014, the Company's board of directors adopted the 2014 Employee Stock Purchase Plan (the "ESPP") and subsequently amended the plan in June 2018. The ESPP authorizes the issuance of up to approximately 0.3 million shares of common stock to participating eligible employees and provides for two six-month offering periods. The Company issued approximately 0.1 million shares under the ESPP during both 2020 and 2019. As of December 31, 2020, there were approximately 0.1 million shares remaining for future issuance under the plan.

***401(k) Savings Plan***

In 2007, the Company established a defined contribution savings plan under Section 401(k) of the Internal Revenue Code ("401(k) Plan"). The 401(k) Plan covers all employees who meet defined minimum age and service requirements, and allows participants to defer a portion of their annual compensation up to the statutory allowable amount for any calendar year on a pretax basis. Beginning January 1, 2015, the Company began making matching contributions to participants in this plan for each dollar contributed, up to 3% of an individual's eligible compensation, up to the annual IRS maximum. During a routine audit of the 401(k) Plan, it was identified that an administrative error had occurred in the calculation of eligible compensation under the Plan. The Company is correcting this issue using the IRS' Employee Plans Compliance Resolution System ("EPCRS"). In accordance with EPCRS, the Company made an additional matching contribution of $0.5 million in order to correct affected participants' accounts. In its normal course of business, the Company made matching contributions to participants in this Plan which totaled $0.2 million during both 2020 and 2019.

**12. Net loss per share**

Basic and diluted net loss per share was calculated as follows for 2020 and 2019 (in thousands, except per share amounts):

| | Years Ended December 31 | |
|---|---|---|
| | 2020 | 2019 |
| **Numerator:** | | |
| Net loss | $ (43,714) | $ (38,950) |
| Less: Change in fair value of 2020 Warrants | (8,067) | — |
| Adjusted net loss | $ (51,781) | $ (38,950) |
| **Denominator:** | | |
| Weighted average common stock outstanding - basic | 44,436 | 20,644 |
| Dilutive effect of common stock issuable from assumed exercise of warrants | 2,117 | — |
| Weighted average common stock outstanding - diluted | 46,553 | 20,644 |
| **Net loss per share:** | | |
| Basic | $ (0.98) | $ (1.89) |
| Diluted | $ (1.11) | $ (1.89) |

The following potential common shares were excluded from the calculation of net loss per share due to their anti-dilutive effect for 2020 and 2019 (in thousands):

| | Years Ended December 31 | |
|---|---|---|
| | 2020 | 2019 |
| Warrants | 4,591 | 4,591 |
| Stock options | 2,329 | 1,323 |
| RSUs | 550 | — |
| Total | 7,470 | 5,914 |

The 2020 Warrants have been included in the calculation of diluted net loss per share as the warrants are both liability-classified and in-the-money. The Company used the treasury stock method to determine the number of dilutive shares.

**13. Income taxes**

The Company did not record a provision (benefit) for income taxes in 2020 or 2019. The Company's losses before income taxes consist solely of domestic losses. The significant components of the Company's deferred income taxes are comprised of the following:

| | December 31 | |
|---|---|---|
| | 2020 | 2019 |
| Deferred tax assets: | | |
| U.S. and state net operating loss carryforwards | $ 25,458 | $ 56,906 |
| Capitalized R&D | 32,057 | 28,427 |
| Research and development credits | 3,784 | 11,717 |
| Lease liability | 2,735 | 1,779 |
| Stock-based compensation | 1,320 | 1,053 |
| Accrued expenses | 866 | 507 |
| Depreciation and amortization | 448 | 545 |
| Other temporary differences | 25 | 38 |
| Gross deferred tax assets | 66,693 | 100,972 |
| Valuation allowance | (64,150) | (99,249) |
| Total deferred tax assets | $ 2,543 | $ 1,723 |
| | | |
| Deferred tax liabilities: | | |
| ROU asset | $ (2,543) | $ (1,723) |
| Total deferred tax liabilities | $ (2,543) | $ (1,723) |

The Company has evaluated the positive and negative evidence bearing upon the realizability of its deferred tax assets. Based on the Company's history of operating losses, the Company has concluded that it is more likely than not that the benefit of its deferred tax assets will not be realized. Accordingly, the Company has provided a full valuation allowance for deferred tax assets as of December 31, 2020 and 2019. The valuation allowance decreased $35.1 million during 2020 due primarily to reductions in the Company's U.S. federal and state net operating loss carryforwards and federal research and development credit carryforwards resulting from the Company's determination that it experienced changes in ownership that limit those carryforwards.

In 2020 and 2019, the Company's effective tax rate differed from the U.S. federal statutory income tax rate as follows:

| | Years Ended December 31 | |
|---|---|---|
| | 2020 | 2019 |
| Federal statutory income tax rate | 21.0 % | 21.0 % |
| State income tax, net of federal benefit | 6.8 % | 6.3 % |
| Permanent differences | 1.7 % | 0.0 % |
| Research and development credit | 2.3 % | 3.3 % |
| Section 382 limitation | (112.1)% | 0.0 % |
| Change in valuation allowance | 80.3 % | (27.4)% |
| Other, net | 0.0 % | (3.2)% |
| Effective tax rate | 0.0 % | 0.0 % |

As of December 31, 2020 and 2019, the Company had U.S. federal net operating loss carryforwards of $94.3 million and $211.5 million, respectively, which may be available to offset future income tax liabilities. As of December 31, 2020, $84.8 million of the U.S. federal net operating loss carryforwards can be carried forward indefinitely, and the remaining $9.5 million expires at various dates through 2037. As of December 31, 2020 and 2019, the Company also had U.S. state net operating loss carryforwards of $89.6 million and $197.7 million, respectively, which may be available to offset future income tax liabilities and expire at various dates through 2040.

As of December 31, 2020 and 2019, the Company had federal research and development tax credit carryforwards of $0.7 million and $8.9 million, respectively, available to reduce future tax liabilities which expire at various dates through 2040. As of December 31, 2020 and 2019, the Company had state research and development tax credit carryforwards of $3.8 million and $3.5 million, respectively, available to reduce future tax liabilities which expire at various dates through 2035.

The Company's net operating loss and tax credit carryforwards are subject to review and possible adjustment by the Internal Revenue Service and state tax authorities. Under Sections 382 and 383 of the Internal Revenue Code of 1986, as amended, as well as similar state provisions, net operating loss and tax credit carryforwards may become subject to an annual limitation in the event of certain cumulative changes in the ownership interest of significant shareholders over a three-year period in excess of 50%. The rules generally operate by focusing on changes in ownership among stockholders considered by the rules as owning, directly or indirectly, 5% or more of the stock of a company and any change in ownership arising from new issuances of stock by the company. The Company completed a detailed Section 382 study during 2020 on its federal net operating losses and tax credits incurred from December 31, 2016, the date of the previous study, through December 31, 2020. Based on the study, the Company underwent two ownership changes for Section 382 purposes which occurred on January 17, 2018 and July 24, 2020. As a result of the ownership changes, all of the Company's federal net operating loss and tax credit carryforwards as of the ownership change dates are subject to limitation under Section 382. Federal net operating loss carryforwards of $149.0 million and federal research and development tax credit carryforwards of $8.9 million are expected to expire unused. As a result of the detailed Section 382 study on its federal net operating losses, the Company also estimated that state net operating loss carryforwards of $139.7 million are expected to expire unused. These tax attributes were excluded from deferred tax assets with a corresponding reduction of the valuation allowance with no net effect on income tax expense or the effective tax rate. Subsequent ownership changes may further affect the limitation in future years.

The Company recognizes interest and penalties related to uncertain tax positions in income tax expense. As of December 31, 2020 and 2019, the Company had no accrued interest or penalties related to uncertain tax positions and no amounts have been recognized in the Company's statements of operations and comprehensive loss.

For all years through December 31, 2020, the Company generated research credits but has not conducted a study to document the qualified activities. This study may result in an adjustment to the Company's research and development credit carryforwards. However, until a study is completed and any adjustment is known, no amounts are being presented as an uncertain tax position for these years. A full valuation allowance has been provided against the Company's research and development credits and, if an adjustment is required, this adjustment would be offset by an adjustment to the deferred tax asset established for the research and development credit carryforwards and the valuation allowance.

The Company files income tax returns in the U.S. and the Commonwealth of Massachusetts. The Company's federal and state income tax returns are generally subject to tax examinations for tax years 2017 through 2020. To the extent the Company has tax attribute carryforwards, the tax years in which the attribute was generated may still be adjusted upon examination by the Internal Revenue Service, state, or foreign tax authorities to the extent utilized in a future period.

**14. Subsequent event**

On February 18, 2021 (the "2021 Loan Closing Date"), the Company entered into a Loan and Security Agreement (the "2021 Loan Agreement") with Silicon Valley Bank ("SVB") for a $10 million term loan (the "2021 Term Loan"). $9.0 million of the proceeds from the 2021 Term Loan were used to repay the Company's borrowings that were outstanding at the 2021 Loan Closing Date under its previous loan and security agreement with Hercules, paying off all obligations owing under, and terminating, the previous loan and security agreement with Hercules on February 18, 2021. The remaining proceeds from the 2021 Term Loan of $1.0 million were received by the Company for working capital and general corporate purposes.

The 2021 Term Loan will mature on September 1, 2023, which may be extended to March 1, 2024 if certain performance milestones are achieved and no event of default has occurred or is continuing. The 2021 Term Loan accrues interest at a floating per annum rate equal to the greater of (i) 6.25% or (ii) the sum of 3.0% plus the prime rate. The 2021 Term Loan provides for interest-only payments until September 30, 2021, which may be extended to March 31, 2022 if certain performance milestones are achieved and no event of default has occurred or is continuing. Thereafter, amortization payments will be payable monthly in equal installments of principal and interest (subject to recalculation upon a change in prime rates) upon expiration of the interest only period through maturity. The 2021 Term Loan is subject to a final payment charge of $0.5 million. The 2021 Term Loan may be prepaid in whole (but not in part), subject to a prepayment charge of 3.0%, if prepaid in any of the first twelve (12) months following the Closing Date, 2.0%, if prepaid after twelve (12) months following the Closing Date but on or prior to twenty four (24) months following the Closing Date, and 1.0% thereafter. Amounts outstanding during an event of default shall be payable on demand and shall accrue interest at an additional rate of 4.0% per annum.

The 2021 Term Loan is secured by a lien on substantially all of the assets of the Company, other than intellectual property (but including proceeds from intellectual property).

The 2021 Loan Agreement contains customary covenants and representations, including a financial reporting covenant and limitations on dividends, indebtedness, liens, investments, distributions, transfers, mergers or acquisitions, transactions with affiliates, corporate changes, deposit accounts, and subsidiaries. There are no financial covenants.

In connection with the 2021 Loan Agreement, the Company issued to SVB a warrant, dated February 18, 2021 (the "2021 Warrant") to purchase shares of the common stock of the Company. The 2021 Warrant is exercisable for 43,478 shares of the Company's common stock with an exercise price of $3.45 per share. The exercise price and the number of shares are subject to adjustment upon a merger event, reclassification of the shares of common stock, subdivision or combination of the shares of common stock or certain dividends payments. The 2021 Warrant is exercisable until the fifth anniversary of the 2021 Loan Closing Date and will be exercised automatically on a net issuance basis if not exercised prior to the expiration date and if the then-current fair market value of one share of common stock is greater than the exercise price then in effect.

**SIGNATURES**

Pursuant to the requirements of Section 13 or 15(d) of the Securities Exchange Act of 1934, the registrant has duly caused this report to be signed on its behalf by the undersigned, thereunto duly authorized on February 22, 2021.

GENOCEA BIOSCIENCES, INC.

By: /s/ William Clark
William Clark
*President and Chief Executive Officer*

Pursuant to the requirements of the Securities Act of 1934, this report has been signed by the following persons on behalf of the registrant in the capacities and on the dates indicated.

| Signature | Title | Date |
|---|---|---|
| /s/ William Clark<br>William Clark | President and Chief Executive Officer and Director<br>(Principal Executive Officer) | February 22, 2021 |
| /s/ Diantha Duvall<br>Diantha Duvall | Chief Financial Officer<br>(Principal Financial Officer and Principal Accounting Officer) | February 22, 2021 |
| /s/ Kenneth Bate<br>Kenneth Bate | Director | February 22, 2021 |
| /s/ Ali Behbahani<br>Ali Behbahani | Director | February 22, 2021 |
| /s/ Katrine Bosley<br>Katrine Bosley | Director | February 22, 2021 |
| /s/ Ronald Cooper<br>Ronald Cooper | Director | February 22, 2021 |
| /s/ Michael Higgins<br>Michael Higgins | Director | February 22, 2021 |
| /s/ Gisela Schwab<br>Gisela Schwab, M.D. | Director | February 22, 2021 |
| /s/ George Siber<br>George Siber, M.D. | Director | February 22, 2021 |

| Exhibit Number | Exhibit |
|---|---|
| 3.1 | Fifth Amended and Restated Certificate of Incorporation (incorporated by reference to Exhibit 3.1 to the Company's Current Report on Form 8-K, File No. 001-36289, filed on February 12, 2014) |
| 3.2 | Certificate of Amendment to the Amended and Restated Certificate of Incorporation (incorporated by reference to Exhibit 3.1 to the Company's Current Report on Form 8-K, File No. 001-36289, filed on June 25, 2018) |
| 3.3 | Certificate of Amendment to the Amended and Restated Certificate of Incorporation (incorporated by reference to Exhibit 3.1 to the Company's Current Report on Form 8-K, File No. 001-36289, filed on May 21, 2019) |
| 3.4 | Certificate of Amendment to Restated Certificate of Incorporation (incorporated by reference to Exhibit 3.1 to the Company's Current Report on Form 8-K, File No. 001-36289, filed on June 2, 2020) |
| 3.5 | Certificate of Correction to the Certificate of Amendment to the Restated Certificate of Incorporation of Genocea Biosciences, Inc. (incorporated by reference to Exhibit 3.5 to the Company's Quarterly Report on Form 10-Q, File No. 001-36289, filed on July 23, 2020) |
| 3.6 | Amended and Restated By-laws (incorporated by reference to Exhibit 3.2 to the Company's Current Report on Form 8-K, File No. 001-36289, filed on February 12, 2014) |
| 4.1 | Form of Common Stock Certificate (incorporated by reference to Exhibit 4.1 to the Company's Registration Statement on Form S-1, File No. 333-193043, filed on December 23, 2013) |
| 4.2 | Fourth Amended and Restated Registration Rights Agreement (incorporated by reference to Exhibit 4.5 to the Company's Registration Statement on Form S-1, File No. 333-193043, filed on December 23, 2013) |
| 4.3 | Certificate of Designation of Preferences, Rights and Limitations of Series A Convertible Preferred Stock (incorporated by reference to Exhibit 4.1 to the Company's Current Report on Form 8-K, File No. 001-36289 filed on January 19, 2018) |
| 4.4 | Form of Class A Warrant to Purchase Shares of Common Stock of Genocea Biosciences, Inc. (incorporated by reference to Exhibit 4.5 to the Company's Annual Report on Form 10-K, File No. 001-36289, filed on February 16, 2018) |
| 4.5 | Warrant Agreement between the Company and Hercules Capital, Inc., dated April 24, 2018 (incorporated by reference to Exhibit 4.1 to the Company's Current Report on Form 8-K, File No. 001-36289, filed on April 30, 2018) |
| 4.6 | Form of Pre-Funded Warrant to Purchase Shares of Common Stock of Genocea Biosciences, Inc. (incorporated by reference to Exhibit 4.1 to the Company's Current Report on Form 8-K, File No. 001-36289, filed on February 12, 2019) |
| 4.7 | Form of Class B Warrant to Purchase Shares of Common Stock of Genocea Biosciences, Inc. (incorporated by reference to Exhibit 4.8 to the Company's Annual Report on Form 10-K, File No. 001-36289, filed on February 28, 2019) |
| 4.8 | Form of Pre-Funded Warrant to Purchase Shares of Common Stock of Genocea Biosciences, Inc. (incorporated by reference to Exhibit 4.1 to the Company's Current Report on Form 8-K, File No. 001-36289, filed on July 22,2020) |
| 4.9 | Form of Class C Warrant to Purchase Shares of Common Stock of Genocea Biosciences, Inc. (incorporated by reference to Exhibit 4.2 to the Company's Current Report on Form 8-K, File No. 001-36289, filed on July 22, 2020) |
| 4.10* | Warrant Agreement between the Company and Silicon Valley Bank, dated February 18, 2021 |
| 4.11 | Description of the Registrant's Securities Registered Pursuant to Section 12 of the Securities Exchange Act of 1934 (incorporated by reference to Exhibit 4.8 of the Company's Annual Report on Form 10-K, File No. 001-36289, filed on February 13, 2020) |
| 10.1 | Form of Director Indemnification Agreement (incorporated by reference to Exhibit 10.1 to the Company's Registration Statement on Form S-1, File No. 333-193043, filed on December 23, 2013) |

| Exhibit Number | Exhibit |
|---|---|
| 10.2++ | Amended and Restated License Agreement between Genocea Biosciences, Inc. and President and Fellows of Harvard College, dated November 19, 2012 (incorporated by reference to Exhibit 10.2 to the Company's Annual Report on Form 10-K, File No. 001-36289, filed on February 13, 2020) |
| 10.3 | License and Supply Agreement, between the Company and Oncovir, Inc., dated January 26, 2018 (incorporated by reference to Exhibit 10.32 to the Company's Annual Report on Form 10-K, File No. 001-36289, filed on February 16, 2018) |
| 10.4 | Lease, dated as of July 3, 2012 between TBCI, LLC and Genocea Biosciences, Inc. (incorporated by reference to Exhibit 10.8 to the Company's Registration Statement on Form S-1, File No. 333-193043, dated December 23, 2013) |
| 10.5 | First Amendment to Lease, dated May 16, 2016, between 100 Discovery Park DE, LLC, a Delaware limited liability company (as successor in interest to TBCI, LLC, as Trustee of 100 Discovery Park Realty Trust) and Genocea Biosciences, Inc. (incorporated by reference to Exhibit 10.30 to the Company's Form 10-Q, File No. 001-36289, filed on August 5, 2016) |
| 10.6 | Second Amendment to the Lease, dated May 1, 2019, between 100 Discovery Park DE, LLC, a Delaware limited liability company (as successor in interest to TBCI, LLC, as Trustee of 100 Discovery Park Realty Trust) and Genocea Biosciences, Inc. (incorporated by reference to Exhibit 10.23 to the Company's Annual Report on Form 10-K, File No. 001-36289, filed on February 13, 2020) |
| 10.7* | Sublease between the Company and Zymergen Inc., dated November 30, 2020 |
| 10.8† | Genocea Biosciences, Inc. Amended and Restated 2007 Equity Incentive Plan, as amended on June 24, 2013 (incorporated by reference to Exhibit 10.10 to the Company's Registration Statement on Form S-1, File No. 333-193043, filed on December 23, 2013) |
| 10.9† | Form of Incentive Stock Option Granted under the Genocea Biosciences, Inc. Amended and Restated 2007 Equity Incentive Plan (incorporated by reference to Exhibit 10.21 to the Company's Registration Statement on Form S-1, File No. 333-193043, filed on December 23, 2013) |
| 10.10† | Form of Nonstatutory Stock Option Granted under the Genocea Biosciences, Inc. Amended and Restated 2007 Equity Incentive Plan (incorporated by reference to Exhibit 10.20 to the Company's Registration Statement on Form S-1, File No. 333-193043, filed on December 23, 2013) |
| 10.11† | Genocea Biosciences, Inc. Amended and Restated 2014 Equity Incentive Plan (incorporated by reference to Exhibit 10.1 to the Company's Current Report on Form 8-K, File No. 001-36289, filed on June 2, 2020) |
| 10.12† | Form of Incentive Stock Option under the Genocea Biosciences, Inc. 2014 Equity Incentive Plan (incorporated by reference to Exhibit 10.22 to the Company's Registration Statement on Form S-1, File No. 333-193043, as amended on January 13, 2014) |
| 10.13† | Form of Nonstatutory Stock Option under the Genocea Biosciences, Inc. 2014 Equity Incentive Plan (incorporated by reference to Exhibit 10.23 to the Company's Registration Statement on Form S-1, File No. 333-193043, as amended on January 13, 2014) |
| 10.14† | Form of Restricted Stock Unit Award Agreement under the Genocea Biosciences, Inc. 2014 Equity Incentive Plan (incorporated by reference to Exhibit 10.3 to the Company's Quarterly Report on Form 10-Q, File No. 001-36289, filed on April 30, 2020) |
| 10.15† | Genocea Biosciences, Inc. 2014 Employee Stock Purchase Plan, as amended (incorporated by reference to Exhibit 10.2 to the Company's Current Report on Form 8-K, File No. 001-36289, filed on June 25, 2018) |
| 10.16† | Genocea Biosciences, Inc. Cash Incentive Plan (incorporated by reference to Exhibit 10.16 to the Company's Registration Statement on Form S-1, File No. 333-193043, as amended on January 13, 2014) |

| Exhibit Number | Exhibit |
|---|---|
| 10.17† | Nonstatutory Stock Option granted under the Genocea Biosciences, Inc. Amended and Restated 2007 Equity Incentive Plan to Katrine Bosley, dated May 13, 2013 (incorporated by reference to Exhibit 10.27 to the Company's Registration Statement on Form S-1, File No. 333-193043, as amended on January 13, 2014) |
| 10.18† | Nonstatutory Stock Option granted under the Genocea Biosciences, Inc. Amended and Restated 2007 Equity Incentive Plan to Katrine Bosley, dated November 5, 2013 (incorporated by reference to Exhibit 10.28 to the Company's Registration Statement on Form S-1, File No. 333-193043, as amended on January 13, 2014) |
| 10.19† | Amended and Restated Employment Letter Agreement between William Clark and Genocea Biosciences, Inc., dated January 16, 2014 (incorporated by reference to Exhibit 10.12 to the Company's Registration Statement on Form S-1, File No. 333-193043, as amended on January 23, 2014) |
| 10.20† | Employment Letter Agreement between Girish Aakalu and Genocea Biosciences, Inc., dated December 6, 2018 (incorporated by reference to Exhibit 10.1 to the Company's Quarterly Report on Form 10-Q, File No. 001-36289, filed on April 30, 2020) |
| 10.21† | Employment Letter Agreement between Thomas Davis and Genocea Biosciences, Inc., dated October 1, 2018 (incorporated by reference to Exhibit 10.2 to the Company's Quarterly Report on Form 10-Q, File No. 001-36289, filed on April 30, 2020) |
| 10.22+ | Amended and Restated Loan and Security Agreement between the Company, the several banks and other financial institutions or entities from time to time parties thereto and Hercules Capital, Inc., dated April 24, 2018 (incorporated by reference to Exhibit 10.4 to the Company's Quarterly Report on Form 10-Q, File No. 001-36289, filed on August 3, 2018) |
| 10.23 | First Amendment to Amended and Restated Loan and Security Agreement between the Company, the several banks and other financial institutions or entities from time to time parties thereto and Hercules Capital, Inc., dated November 14, 2019 (incorporated by reference to Exhibit 10.1 to the Company's Current Report on Form 8-K, File No. 001-36289, filed on November 19, 2019) |
| 10.24 | Equity Rights Letter Agreement between the Company and Hercules Technology Growth Capital, Inc., dated November 20, 2014 (incorporated by reference to Exhibit 10.2 to the Company's Current Report on Form 8-K, File No. 001-36289, filed on November 21, 2014) |
| 10.25 | Amendment to Equity Rights Letter Agreement between the Company, Hercules Capital, Inc. (f/k/a Hercules Technology Growth Capital, Inc.), dated April 24, 2018 (incorporated by reference to Exhibit 10.1 to the Company's Current Report on Form 8-K, File No. 001-36289, filed on April 30, 2018) |
| 10.26*++ | Loan and Security Agreement between the Company and Silicon Valley Bank, dated February 18, 2021 |
| 21.1 | List of Subsidiaries of the Company (incorporated by reference to Exhibit 21.1 to the Company's Form 10-K, File No. 001-36289, filed on February 17, 2016) |
| 23.1* | Consent of Ernst & Young LLP |
| 31.1* | Rule 13a-14(a) / 15d-14(a) Certification of Principal Executive Officer |
| 31.2* | Rule 13a-14(a) / 15d-14(a) Certification of Principal Financial Officer |
| 32** | Section 1350 Certifications of Principal Executive Officer and Principal Financial Officer |
| 101. INS* | Inline XBRL Instance Document – the instance document does not appear in the Interactive Data File because XBRL tags are embedded within the Inline XBRL document |
| 101. SCH* | Inline XBRL Taxonomy Extension Schema Document |
| 101. CAL* | Inline XBRL Taxonomy Extension Calculation Linkbase Document |
| 101. DEF* | Inline XBRL Taxonomy Extension Definition Linkbase Document |
| 101. LAB* | Inline XBRL Taxonomy Extension Label Linkbase Document |
| 101. PRE* | Inline XBRL Taxonomy Extension Presentation Linkbase Document |

| Exhibit Number | Exhibit |
|---|---|
| 104* | Cover Page Interactive Data File (embedded within the Inline XBRL document) |

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* Filed herewith.

** Furnished herewith.

† Indicates a management contract or compensatory plan.

+ Portions of this exhibit (indicated by asterisks) have been omitted pursuant to a request for confidential treatment and this exhibit has been submitted separately to the Securities and Exchange Commission.

++ Portions of this exhibit (indicated by asterisks) have been omitted because the Registrant has determined they are not material and would likely cause competitive harm to the Registrant if publicly disclosed.

THIS WARRANT AND THE SHARES ISSUABLE HEREUNDER HAVE NOT BEEN REGISTERED UNDER THE SECURITIES ACT OF 1933, AS AMENDED (THE "**ACT**"), OR THE SECURITIES LAWS OF ANY STATE AND, EXCEPT AS SET FORTH IN SECTIONS 5.3 AND 5.4 BELOW, MAY NOT BE OFFERED, SOLD, PLEDGED OR OTHERWISE TRANSFERRED UNLESS AND UNTIL REGISTERED UNDER SAID ACT AND LAWS OR, IN THE OPINION OF LEGAL COUNSEL IN FORM AND SUBSTANCE SATISFACTORY TO THE ISSUER, SUCH OFFER, SALE, PLEDGE OR OTHER TRANSFER IS EXEMPT FROM SUCH REGISTRATION.

## WARRANT TO PURCHASE STOCK

**Company:** Genocea Biosciences, Inc., a Delaware corporation
**Number of Shares:** 43,478, subject to adjustment
**Type/Series of Stock:** Common Stock, $0.001 par value per share
**Warrant Price:** $3.45 per Share, subject to adjustment
**Issue Date:** February 18, 2021
**Expiration Date:** February 18, 2026 **See also Section 5.1(b).**
**Credit Facility:** This Warrant to Purchase Stock ("**Warrant**") is issued in connection with that certain Loan and Security Agreement of even date herewith between Silicon Valley Bank and the Company (as amended and/or modified and in effect from time to time, the "**Loan Agreement**").

THIS WARRANT CERTIFIES THAT, for good and valuable consideration, SILICON VALLEY BANK (together with any successor or permitted assignee or transferee of this Warrant or of any shares issued upon exercise hereof, "**Holder**") is entitled to purchase up to the above-stated number of fully paid and non-assessable shares (the "**Shares**") of the above-stated Type/Series of Stock (the "**Class**") of the above-named company (the "**Company**") at the above-stated Warrant Price, all as set forth above and as adjusted pursuant to Section 2 of this Warrant, subject to the provisions and upon the terms and conditions set forth in this Warrant. Reference is made to Section 5.4 of this Warrant whereby Silicon Valley Bank shall transfer this Warrant to its parent company, SVB Financial Group.

### SECTION 1. EXERCISE.

1.1 Method of Exercise. Holder may at any time and from time to time exercise this Warrant, in whole or in part, by delivering to the Company the original of this Warrant together with a duly executed Notice of Exercise in substantially the form attached hereto as Appendix 1 and, unless Holder is exercising this Warrant pursuant to a cashless exercise set forth in Section 1.2, a check, wire transfer of same-day funds (to an account designated by the Company), or other form of payment acceptable to the Company for the aggregate Warrant Price for the Shares being purchased. Notwithstanding any contrary provision herein, if this Warrant was originally executed and/or delivered electronically, in no event shall Holder be required to surrender or deliver an ink-signed paper copy of this Warrant in connection with its exercise hereof or of any rights hereunder, nor shall Holder be required to surrender or deliver a paper or other physical copy of this Warrant in connection with any exercise hereof.

1.2 Cashless Exercise. On any exercise of this Warrant, in lieu of payment of the aggregate Warrant Price in the manner as specified in Section 1.1 above, but otherwise in accordance

with the requirements of Section 1.1, Holder may elect to receive Shares equal to the value of this Warrant, or portion hereof as to which this Warrant is being exercised. Thereupon, the Company shall issue to the Holder such number of fully paid and non-assessable Shares as are computed using the following formula:

X = Y(A-B)/A

where:
X = the number of Shares to be issued to the Holder;

Y = the number of Shares with respect to which this Warrant is being exercised (inclusive of the Shares surrendered to the Company in payment of the aggregate Warrant Price);

A = the fair market value (as determined pursuant to Section 1.3 below) of one Share; and

B = the Warrant Price.

1.3 Fair Market Value. If shares of the Class are then traded or quoted on a nationally recognized securities exchange, inter-dealer quotation system or over-the-counter market (a "**Trading Market**"), the fair market value of a Share shall be the closing price or last sale price of a share of the Class reported for the Business Day immediately before the date on which Holder delivers this Warrant together with its Notice of Exercise to the Company. If shares of the Class are not then traded in a Trading Market, the Board of Directors of the Company shall determine the fair market value of a Share in its reasonable good faith judgment.

1.4 Delivery of Certificate and New Warrant. Within a reasonable time after Holder exercises this Warrant in the manner set forth in Section 1.1 or 1.2 above, the Company shall deliver to Holder a certificate representing the Shares issued to Holder upon such exercise and, if this Warrant has not been fully exercised and has not expired, a new warrant of like tenor representing the Shares not so acquired.

1.5 Replacement of Warrant. On receipt of evidence reasonably satisfactory to the Company of the loss, theft, destruction or mutilation of this Warrant and, in the case of loss, theft or destruction, on delivery of an indemnity agreement reasonably satisfactory in form, substance and amount to the Company or, in the case of mutilation, on surrender of this Warrant to the Company for cancellation, the Company shall, within a reasonable time, execute and deliver to Holder, in lieu of this Warrant, a new warrant of like tenor and amount.

1.6 Treatment of Warrant Upon Acquisition of Company.

(a) Acquisition. For the purpose of this Warrant, "**Acquisition**" means any transaction or series of related transactions involving: (i) the sale, lease, exclusive license, or other disposition of all or substantially all of the assets of the Company; (ii) any merger or consolidation of the Company into or with another person or entity (other than a merger or consolidation effected exclusively

to change the Company's domicile), or any other corporate reorganization, in which the stockholders of the Company in their capacity as such immediately prior to such merger, consolidation or reorganization, own less than a majority of the Company's (or the surviving or successor entity's) outstanding voting power immediately after such merger, consolidation or reorganization (or, if such Company stockholders beneficially own a majority of the outstanding voting power of the surviving or successor entity as of immediately after such merger, consolidation or reorganization, such surviving or successor entity is not the Company); or (iii) any sale or other transfer by the stockholders of the Company of shares representing at least a majority of the Company's then-total outstanding combined voting power.

(b) Treatment of Warrant at Acquisition. In the event of an Acquisition in which the consideration to be received by the Company's stockholders consists solely of cash, solely of Marketable Securities or a combination of cash and Marketable Securities (a "**Cash/Public Acquisition**"), and the fair market value of one Share as determined in accordance with Section 1.3 above would be greater than the Warrant Price in effect on such date immediately prior to such Cash/Public Acquisition, and Holder has not exercised this Warrant pursuant to Section 1.1 above as to all Shares, then this Warrant shall automatically be deemed to be Cashless Exercised pursuant to Section 1.2 above as to all Shares effective immediately prior to and contingent upon the consummation of a Cash/Public Acquisition. In connection with such Cashless Exercise, Holder shall be deemed to have restated each of the representations and warranties in Section 4 of the Warrant as of the date thereof and the Company shall promptly notify the Holder of the number of Shares (or such other securities) issued upon exercise. In the event of a Cash/Public Acquisition where the fair market value of one Share as determined in accordance with Section 1.3 above would be less than the Warrant Price in effect immediately prior to such Cash/Public Acquisition, then this Warrant will expire immediately prior to the consummation of such Cash/Public Acquisition.

(c) Upon the closing of any Acquisition other than a Cash/Public Acquisition, the acquiring, surviving or successor entity shall assume the obligations of this Warrant, and this Warrant shall thereafter be exercisable for the same securities and/or other property as would have been paid for the Shares issuable upon exercise of the unexercised portion of this Warrant as if such Shares were outstanding on and as of the closing of such Acquisition, subject to further adjustment from time to time in accordance with the provisions of this Warrant.

(d) As used in this Warrant, "**Marketable Securities**" means securities meeting all of the following requirements: (i) the issuer thereof is then subject to the reporting requirements of Section 13 or Section 15(d) of the Securities Exchange Act of 1934, as amended (the "**Exchange Act**"), and is then current in its filing of all required reports and other information under the Act and the Exchange Act; (ii) the class and series of shares or other security of the issuer that would be received by Holder in connection with the Acquisition were Holder to exercise this Warrant on or prior to the closing thereof is then traded in a Trading Market, and (iii) following the closing of such Acquisition, Holder would not be restricted from publicly re-selling all of the issuer's shares and/or other securities that would be received by Holder in such Acquisition were Holder to exercise this Warrant in full on or prior to the closing of such Acquisition, except to the extent that any such restriction (x) arises solely under federal or state securities laws, rules or regulations, and (y) does not extend beyond six (6) months from the closing of such Acquisition.

SECTION 2. ADJUSTMENTS TO THE SHARES AND WARRANT PRICE.

2.1 Stock Dividends, Splits, Etc. If the Company declares or pays a dividend or distribution on the outstanding shares of the Class payable in additional shares of the Class or other securities or property (other than cash), then upon exercise of this Warrant, for each Share acquired, Holder shall receive, without additional cost to Holder, the total number and kind of securities and property which Holder would have received had Holder owned the Shares of record as of the date the dividend or distribution occurred. If the Company subdivides the outstanding shares of the Class by reclassification or otherwise into a greater number of shares, the number of Shares purchasable hereunder shall be proportionately increased and the Warrant Price shall be proportionately decreased. If the outstanding shares of the Class are combined or consolidated, by reclassification or otherwise, into a lesser number of shares, the Warrant Price shall be proportionately increased and the number of Shares shall be proportionately decreased.

2.2 Reclassification, Exchange, Combinations or Substitution. Upon any event whereby all of the outstanding shares of the Class are reclassified, exchanged, combined, substituted, or replaced for, into, with or by Company securities of a different class and/or series, then from and after the consummation of such event, this Warrant will be exercisable for the number, class and series of Company securities that Holder would have received had the Shares been outstanding on and as of the consummation of such event, and subject to further adjustment thereafter from time to time in accordance with the provisions of this Warrant. The provisions of this Section 2.2 shall similarly apply to successive reclassifications, exchanges, combinations, substitutions, replacements or other similar events.

2.3 No Fractional Share. No fractional Share shall be issuable upon exercise of this Warrant and the number of Shares to be issued shall be rounded down to the nearest whole Share. If a fractional Share interest arises upon any exercise of the Warrant, the Company shall eliminate such fractional Share interest by paying Holder in cash the amount computed by multiplying the fractional interest by (i) the fair market value (as determined in accordance with Section 1.3 above) of a full Share, less (ii) the then-effective Warrant Price.

2.4 Notice/Certificate as to Adjustments. Upon each adjustment of the Warrant Price, Class and/or number of Shares, the Company, at the Company's expense, shall notify Holder in writing within a reasonable time setting forth the adjustments to the Warrant Price, Class and/or number of Shares and facts upon which such adjustment is based. The Company shall, upon written request from Holder, furnish Holder with a certificate of its Chief Financial Officer, including computations of such adjustment and the Warrant Price, Class and number of Shares in effect upon the date of such adjustment.

SECTION 3. REPRESENTATIONS AND COVENANTS OF THE COMPANY.

3.1 Representations and Warranties. The Company represents and warrants to, and agrees with, the Holder as follows:

(a) [Reserved].

(b) All Shares which may be issued upon the exercise of this Warrant shall, upon issuance, be duly authorized, validly issued, fully paid and non-assessable, and free of any liens

and encumbrances except for restrictions on transfer provided for herein or under applicable federal and state securities laws. The Company covenants that it shall at all times cause to be reserved and kept available out of its authorized and unissued capital stock such number of shares of the Class and other securities as will be sufficient to permit the exercise in full of this Warrant.

(c) [Reserved]

3.2 Notice of Certain Events. If the Company proposes at any time to:

(a) declare any dividend or distribution upon the outstanding shares of the Class, whether in cash, property, stock, or other securities and whether or not a regular cash dividend;

(b) offer for subscription or sale pro rata to the holders of the outstanding shares of the Class any additional shares of any class or series of the Company's stock (other than pursuant to contractual pre-emptive rights);

(c) effect any reclassification, exchange, combination, substitution, reorganization or recapitalization of the outstanding shares of the Class; or

(d) effect an Acquisition or to liquidate, dissolve or wind up;

then, in connection with each such event, the Company shall give Holder notice thereof at the same time and in the same manner as it gives notice thereof to holders of the outstanding shares of the Class.

The Company will also provide information requested by Holder from time to time, within a reasonable time following each such request, that is reasonably necessary to enable Holder to comply with Holder's accounting or reporting requirements.

SECTION 4. REPRESENTATIONS, WARRANTIES OF THE HOLDER.

The Holder represents and warrants to the Company as follows:

4.1 Purchase for Own Account. This Warrant and the Shares to be acquired upon exercise of this Warrant by Holder are being acquired for investment for Holder's account, not as a nominee or agent, and not with a view to the public resale or distribution within the meaning of the Act. Holder also represents that it has not been formed for the specific purpose of acquiring this Warrant or the Shares.

4.2 Disclosure of Information. Holder is aware of the Company's business affairs and financial condition and has received or has had full access to all the information it considers necessary or appropriate to make an informed investment decision with respect to the acquisition of this Warrant and its underlying securities. Holder further has had an opportunity to ask questions and receive answers from the Company regarding the terms and conditions of the offering of this Warrant and its underlying securities and to obtain additional information (to the extent the Company possessed such information or could acquire it without unreasonable effort or expense) necessary to verify any information furnished to Holder or to which Holder has access.

4.3 Investment Experience. Holder understands that the purchase of this Warrant and its underlying securities involves substantial risk. Holder has experience as an investor in securities of companies in the development stage and acknowledges that Holder can bear the economic risk of such Holder's investment in this Warrant and its underlying securities and has such knowledge and experience in financial or business matters that Holder is capable of evaluating the merits and risks of its investment in this Warrant and its underlying securities and/or has a preexisting personal or business relationship with the Company and certain of its officers, directors or controlling persons of a nature and duration that enables Holder to be aware of the character, business acumen and financial circumstances of such persons.

4.4 Accredited Investor Status. Holder is an "accredited investor" within the meaning of Regulation D promulgated under the Act.

4.5 The Act. Holder understands that this Warrant and the Shares issuable upon exercise hereof have not been registered under the Act in reliance upon a specific exemption therefrom, which exemption depends upon, among other things, the bona fide nature of the Holder's investment intent as expressed herein. Holder understands that this Warrant and the Shares issued upon any exercise hereof must be held indefinitely unless subsequently registered under the Act and qualified under applicable state securities laws, or unless exemption from such registration and qualification are otherwise available. Holder is aware of the provisions of Rule 144 promulgated under the Act.

4.6 No Voting Rights. Holder, as a Holder of this Warrant, will not have any voting rights until the exercise of this Warrant.

SECTION 5. MISCELLANEOUS.

5.1 Term; Automatic Cashless Exercise Upon Expiration.

(a) Term. Subject to the provisions of Section 1.6 above, this Warrant is exercisable in whole or in part at any time and from time to time on or before 6:00 PM, Pacific time, on the Expiration Date and shall be void thereafter.

(b) Automatic Cashless Exercise upon Expiration. In the event that, upon the Expiration Date, the fair market value of one Share as determined in accordance with Section 1.3 above is greater than the Warrant Price in effect on such date, then this Warrant shall automatically be deemed on and as of such date to be exercised pursuant to Section 1.2 above as to all Shares for which it shall not previously have been exercised, and the Company shall, within a reasonable time, deliver a certificate representing the Shares issued upon such exercise to Holder.

5.2 Legends. Each certificate evidencing Shares shall be imprinted with a legend in substantially the following form:

> THE SHARES EVIDENCED BY THIS CERTIFICATE HAVE NOT BEEN REGISTERED UNDER THE SECURITIES ACT OF 1933, AS AMENDED (THE "**ACT**"), OR THE SECURITIES LAWS OF ANY STATE AND, EXCEPT AS SET FORTH IN THAT CERTAIN WARRANT TO PURCHASE STOCK ISSUED BY THE ISSUER TO SILICON VALLEY BANK DATED

FEBRUARY 18, 2021, MAY NOT BE OFFERED, SOLD, PLEDGED OR OTHERWISE TRANSFERRED UNLESS AND UNTIL REGISTERED UNDER SAID ACT AND LAWS OR, IN THE OPINION OF LEGAL COUNSEL IN FORM AND SUBSTANCE SATISFACTORY TO THE ISSUER, SUCH OFFER, SALE, PLEDGE OR OTHER TRANSFER IS EXEMPT FROM SUCH REGISTRATION.

5.3 Compliance with Securities Laws on Transfer. This Warrant and the Shares issued upon exercise of this Warrant may not be transferred or assigned in whole or in part except in compliance with applicable federal and state securities laws by the transferor and the transferee (including, without limitation, the delivery of investment representation letters and legal opinions reasonably satisfactory to the Company, as reasonably requested by the Company). The Company shall not require Holder to provide an opinion of counsel if the transfer is to SVB Financial Group (Silicon Valley Bank's parent company) or any other affiliate of Holder, provided that any such transferee is an "accredited investor" as defined in Regulation D promulgated under the Act.

5.4 Transfer Procedure. After receipt by Silicon Valley Bank of the executed Warrant, Silicon Valley Bank will transfer all of this Warrant to its parent company, SVB Financial Group. By its acceptance of this Warrant, SVB Financial Group hereby makes to the Company each of the representations and warranties set forth in Section 4 hereof and agrees to be bound by all of the terms and conditions of this Warrant as if the original Holder hereof. Subject to the provisions of Section 5.3 and upon providing the Company with written notice, SVB Financial Group and any subsequent Holder may transfer all or part of this Warrant or the Shares issued upon exercise of this Warrant to any transferee, provided, however, in connection with any such transfer, SVB Financial Group or any subsequent Holder will give the Company notice of the portion of the Warrant and/or Shares being transferred with the name, address and taxpayer identification number of the transferee and Holder will surrender this Warrant to the Company for reissuance to the transferee(s) (and Holder if applicable); and provided further, that any subsequent transferee other than SVB Financial Group shall agree in writing with the Company to be bound by all of the terms and conditions of this Warrant.

5.5 Notices. All notices and other communications hereunder from the Company to the Holder, or vice versa, shall be deemed delivered and effective (i) when given personally, (ii) on the third (3rd) Business Day after being mailed by first-class registered or certified mail, postage prepaid, (iii) upon actual receipt if given by facsimile or electronic mail and such receipt is confirmed in writing by the recipient, or (iv) on the first Business Day following delivery to a reliable overnight courier service, courier fee prepaid, in any case at such address as may have been furnished to the Company or Holder, as the case may be, in writing by the Company or such Holder from time to time in accordance with the provisions of this Section 5.5. All notices to Holder shall be addressed as follows until the Company receives notice of a change of address in connection with a transfer or otherwise:

SVB Financial Group
Attn: Treasury Department
3003 Tasman Drive, HC 215
Santa Clara, CA 95054
Telephone: (408) 654-7400
Facsimile: (408) 988-8317
Email address: svbfgwarrants@svb.com

Notice to the Company shall be addressed as follows until Holder receives notice of a change in address:

Genocea Biosciences, Inc.
Attn: Chief Financial Officer
100 Acorn Park Drive
Cambridge, MA 02140
Telephone: (617) 876-8191
Email:

With a copy (which shall not constitute notice) to:

Ropes & Gray LLP
Attn: Marc A. Rubenstein
Prudential Tower
800 Boylston Street
Boston, MA 02199
Telephone: (617) 951-7000
Email:

5.6 Waiver. This Warrant and any term hereof may be changed, waived, discharged or terminated (either generally or in a particular instance and either retroactively or prospectively) only by an instrument in writing signed by the party against which enforcement of such change, waiver, discharge or termination is sought.

5.7 Attorneys' Fees. In the event of any dispute between the parties concerning the terms and provisions of this Warrant, the party prevailing in such dispute shall be entitled to collect from the other party all costs incurred in such dispute, including reasonable attorneys' fees.

5.8 Counterparts; Facsimile/Electronic Signatures. This Warrant may be executed by one or more of the parties hereto in any number of separate counterparts, all of which together shall constitute one and the same instrument. The Company, Holder and any other party hereto may execute this Warrant by electronic means and each party hereto recognizes and accepts the use of electronic signatures and the keeping of records in electronic form by any other party hereto in connection with the execution and storage hereof. To the extent that this Warrant or any agreement subject to the terms hereof or any amendment hereto is executed, recorded or delivered electronically, it shall be binding to the same extent as though it had been executed on paper with an original ink signature, as provided under applicable law, including, without limitation, any state law based on the Uniform Electronic Transactions Act. The fact that this Warrant is executed, signed, stored or delivered electronically shall not prevent the transfer by any Holder of this Warrant pursuant to Section 5.4 or the enforcement of the terms hereof.

5.9 Headings. The headings in this Warrant are for purposes of reference only and shall not limit or otherwise affect the meaning of any provision of this Warrant.

5.10 Business Days. "**Business Day**" is any day that is not a Saturday, Sunday or a day on which Silicon Valley Bank is closed.

SECTION 6. GOVERNING LAW, VENUE, JURY TRIAL WAIVER, AND JUDICIAL REFERENCE.

6.1 Governing Law. This Warrant shall be governed by and construed in accordance with the laws of the Commonwealth of Massachusetts, without giving effect to its principles regarding conflicts of law.

6.2 Jurisdiction and Venue. The Company and Holder each submit to the exclusive jurisdiction of the State and Federal courts in Suffolk County, Massachusetts; provided, however, that nothing in this Warrant shall be deemed to operate to preclude Holder from bringing suit or taking other legal action in any other jurisdiction to enforce a judgment or other court order in favor of Holder. The Company expressly submits and consents in advance to such jurisdiction in any action or suit commenced in any such court, and the Company hereby waives any objection that it may have based upon lack of personal jurisdiction, improper venue, or forum non conveniens and hereby consents to the granting of such legal or equitable relief as is deemed appropriate by such court. The Company hereby waives personal service of the summons, complaints, and other process issued in such action or suit and agrees that service of such summons, complaints, and other process may be made in accordance with Section 5.5 of this Warrant.

6.3 Jury Trial Waiver. **TO THE FULLEST EXTENT PERMITTED BY APPLICABLE LAW, THE COMPANY AND HOLDER EACH WAIVE THEIR RIGHT TO A JURY TRIAL OF ANY CLAIM OR CAUSE OF ACTION ARISING OUT OF OR BASED UPON THIS WARRANT, THE LOAN AGREEMENT OR ANY CONTEMPLATED TRANSACTION, INCLUDING CONTRACT, TORT, BREACH OF DUTY AND ALL OTHER CLAIMS. THIS WAIVER IS A MATERIAL INDUCEMENT FOR THE PARTIES' AGREEMENT TO THIS WARRANT. EACH PARTY HAS REVIEWED THIS WAIVER WITH ITS COUNSEL**.

6.4 Survival. This Section 6 shall survive the termination of this Warrant.

[Remainder of page left blank intentionally]
[Signature page follows]

IN WITNESS WHEREOF, the parties have caused this Warrant to Purchase Stock to be executed by their duly authorized representatives effective as of the Issue Date written above.

"COMPANY"

GENOCEA BIOSCIENCES, INC.

By: /s/ Diantha Duvall

Name: Diantha Duvall
Title: Chief Financial Officer and Secretary

"HOLDER"

SILICON VALLEY BANK

By: /s/ James Caccavaro

Name: James Caccavaro
Title: Vice President

APPENDIX 1

NOTICE OF EXERCISE

1. The undersigned Holder hereby exercises its right to purchase _____ shares of the Common/Series _____ Preferred [circle one] Stock of _____ (the "**Company**") in accordance with the attached Warrant To Purchase Stock, and tenders payment of the aggregate Warrant Price for such shares as follows:

[ ] check in the amount of $_____ payable to order of the Company enclosed herewith

[ ] Wire transfer of immediately available funds to the Company's account

[ ] Cashless Exercise pursuant to Section 1.2 of the Warrant

[ ] Other [Describe] _____

2. Please issue a certificate or certificates representing the Shares in the name specified below:

_____
Holder's Name

_____

_____
(Address)

3. By its execution below and for the benefit of the Company, Holder hereby restates each of the representations and warranties in Section 4 of the Warrant to Purchase Stock as of the date hereof.

HOLDER:

_____

By:_____

Name:_____

Title:_____

(Date):_____

ny-2054167

# SUBLEASE

This instrument is a Sublease (the "Sublease") dated as of November 30, 2020 (the "Execution Date") between **GENOCEA BIOSCIENCES, INC.**, a Delaware corporation ("Sublessor"), and **ZYMERGEN INC.**, a Delaware corporation ("Sublessee"). The parties to this instrument hereby agree with each other as follows:

## Article 1

## SUMMARY OF BASIC SUBLEASE PROVISIONS

### 1.1 BASIC DATA

ALL CAPITALIZED TERMS USED HEREIN SHALL HAVE THE MEANINGS ASCRIBED TO THEM IN THE PRIME LEASE (hereinafter defined) UNLESS OTHERWISE DEFINED HEREIN.

Commencement Date: The later of (i) the date upon which the Delivery Condition (as defined below) has been satisfied, which is estimated to occur on January 1, 2021; and (ii) the date that Prime Lessor has delivered its written consent to this Sublease.

Sublessor: Genocea Biosciences, Inc., a Delaware corporation

Mailing Address
of Sublessor: 100 Acorn Park Drive, 5th Floor
Cambridge, MA 02140
Attn: Director, Operations

With a copy to:

Genocea Biosciences.
100 Acorn Park Drive, 5th Floor
Cambridge, MA 02140
Attn: General Counsel

Sublessee: Zymergen Inc.

Mailing Address
of Sublessee (before and after Commencement Date): Zymergen Inc.
5980 Horton Street, Suite 105
Emeryville, CA 94608
Attn: VP Site Operations

With a copy to:

Zymergen Inc.
5980 Horton Street, Suite 105
Emeryville, CA 94608
Attn: General Counsel

| | |
|---|---|
| Permitted Uses: | For general office and laboratory purposes, and for no other purpose, subject to applicable Legal Requirements (as defined in the Prime Lease). |
| Premises: | Approximately 22,442 leasable square feet located on the sixth (6th) floor of 100 Acorn Park Drive, Cambridge Massachusetts (the "Building"), as approximately shown on the attached **Exhibit A**. The Premises demised under this Sublease comprises a portion of the premises leased (the "Leased Premises") to Sublessor by Prime Lessor under the Prime Lease (as such terms are defined below) and is identified and defined in the Prime Lease as the Expansion Premises. |
| Prime Lease: | That certain Lease dated as of July 3, 2012, by and between Prime Lessor, as landlord, and Sublessor, as lessee, as amended by that certain First Amendment to Lease dated as of May 16, 2016, as further amendment by that certain Second Amendment to Lease dated May 1, 2019, redacted copies of which are attached hereto as **Exhibit B**. |
| Prime Lessor: | 100 Discovery Park DE, LLC, a Delaware limited liability company, as successor-in-interest to TBCI, LLC, as Trustee of 100 Discovery Park Realty Trust |
| Base Rent: | $1,425,067.00 per annum ($63.50 per rentable square foot), on a triple net basis, payable in monthly installments of $118,755.58 each. The Base Rent shall increase by three percent (3%) annually on each anniversary of the Commencement Date, including with respect to any Option Term or Extension Term (as hereinafter defined). |
| Additional Rent: | Sublessee shall pay as Additional Rent: (a) Sublessee's Project Share (as defined below) of |

Project Taxes, Project Insurance Costs, and Project Operating Costs (as such terms are defined in the Prime Lease); (b) Sublessee's Building Share (as defined below) of Building Taxes, Building Insurance Costs, and Building Operating Costs (as such terms are defined in the Prime Lease); (c) the actual cost of all utility services provided to the Premises and/or HVAC equipment and systems exclusively serving the Premises ("Sublessee's Utility Costs"), based upon the amounts charged to Sublessor therefor by Prime Lessor, to the extent not paid directly to the utility provider; (d) Other Additional Rent (as defined in the Prime Lease) payable by Sublessor pursuant to the Prime Lease to the extent attributable to Sublessee's use of the Premises; and (e) any other amounts to be paid by Sublessee to Sublessor under this Sublease.

Security Deposit: $237,511, in the form of a Letter of Credit

Sublessee's Building Share: 17.5%, as the same may be adjusted from time to time in accordance with the Prime Lease.

Sublessee's Project Share: 6.8%, as the same may be adjusted from time to time in accordance with the Prime Lease.

Sublease Term or Term: Beginning on the Commencement Date and expiring at 11:59 pm on the day that is immediately prior to the eighteen (18) month anniversary of the Commencement Date.

Option Term: One (1) option to extend the Term for a period of two (2) months, pursuant to the terms and provisions of Section 3.1.2, below.

Extension Term: Three (3) options to extend the Term for a period of six (6) months each, subject to Sublessor's approval and otherwise pursuant to the terms and provisions of Section 3.1.3, below.

Sublessee's Parking Allocation: 33 parking spaces (based on 1.5 parking spaces per 1,000 leasable square feet of the Premises), which spaces shall be allocated and available to Sublessee throughout the Term in Parking Garage A (as defined in the Prime Lease), as the same may be

adjusted from time to time in accordance with the Prime Lease.

Sublessee's Broker: Newmark Knight Frank

Sublessor's Broker: Jones Lang LaSalle

## Article 2

## PREMISES

### 2.1 SUBLEASE OF PREMISES

**2.1.1** Subject to and provided that Prime Lessor gives Prime Lessor's written consent to the subleasing contemplated by this Sublease, Sublessor hereby subleases to Sublessee, and Sublessee hereby accepts and subleases from Sublessor, upon and subject to the terms and provisions of the Prime Lease, all of Sublessor's right, title and interest in and to the Premises pursuant to the Prime Lease, as incorporated into and subject to the terms and conditions of this Sublease. Included as part of the Premises sublet hereunder are all of Sublessor's appurtenant rights under the Prime Lease to use the common areas and facilities of the Building and the Project, including without limitation Sublessee's Parking Allocation, subject in all events to the Prime Lessor's rights reserved and excepted in the Prime Lease.

### 2.2 PRIME LEASE

**2.2.1** Sublessor hereby represents and warrants that: (i) Sublessor is the tenant under the Prime Lease and has the full right to enter into this Sublease (subject, however, to Prime Lessor's consent); (ii) the Prime Lease is in full force and effect; (iii) Sublessor has not received from Prime Lessor any written notice of any default on the part of Sublessor as tenant under the Prime Lease which has not been cured, nor has Sublessor given Prime Lessor written notice of any default on the part of Prime Lessor as landlord under the Prime Lease which has not been cured; (iv) to the best of Sublessor's actual knowledge, without independent investigation, no defaults exist by either Sublessor or the Prime Lessor under the Prime Lease, (v) Sublessor, without having undertaken any independent investigation, has no knowledge of any condition in the Premises that violates Applicable Laws, the Declaration or the Ground Lease, (vi) to Sublessor's actual knowledge, without having undertaken any independent investigation, all building systems and equipment serving the Premises are in good working order (it being understood that Prime Lessor is responsible for the repair and maintenance of such building systems), and (vii) a true and complete copy of the Prime Lease with certain redactions is attached hereto as **Exhibit B**. Sublessee warrants and acknowledges that it has reviewed the Prime Lease and is satisfied with the arrangements therein reflected. Sublessee also represents and warrants that it is satisfied with the present condition of the Premises (which Sublessee takes "as is" without any representation or warranty by Sublessor regarding the condition of the Premises or the fitness of the Premises for any particular use and without any obligation of any kind on Sublessor to make any repairs or improvements thereto in connection with Sublessee's occupancy) and with Sublessee's ability to use the Premises on the terms herein set forth. Sublessor will be responsible for the cost of any work required to correct violations of Applicable Laws which existed prior to the

Commencement Date, except to the extent the need to comply with such Applicable Laws is solely triggered by the unique and particular use of Sublessee (as opposed to office and lab use generally) and excluding any compliance of the Premises with the Americans with Disabilities Act or Massachusetts or local disabilities laws. In the event that during the Sublease Term, Sublessee is required to perform any major capital repair or replacement of systems or equipment in the Premises (a "Major Capital Item"), which Major Capital Item is not the responsibility of Prime Lessor and applies to systems or equipment which will be surrendered at the end of the Sublease Term and which major capital repair or replacement was not caused by the actions or omissions of Sublessee or its Invitees, then Sublessee, after first consulting with Sublessor, will perform such Major Capital Item, and the cost of such work that is in excess of Fifty Thousand Dollars ($50,000) (*i.e.*, Sublessee will be responsible for the first $50,000 of the cost of repair or replacement of each Major Capital Item that requires repair or replacement during the Sublease Term) will be allocated between Sublessor and Sublessee as follows: Sublessee will pay the portion of the cost of such Major Capital Item equal to the number of months remaining in the Sublease Term divided by the number of months in the useful life of the Major Capital Item, as determined in accordance with generally accepted accounting principles, and Sublessor will pay the remainder of the cost of such Major Capital Item. Sublessor's share of such cost will be payable within thirty (30) days after receipt of a reasonably detailed invoice from Sublessee detailing the work performed and calculation of cost allocation.

**2.2.2** The Prime Lease is by this reference incorporated into and made a part hereof, except that

(i) all references in the Prime Lease to “Landlord”, “Tenant”, “Lease”, “Lease Term”, “Tenant’s Parking Allocation”, “Tenant’s Parking Charges”, “Tenant’s Project Share”, “Tenant’s Building Share”, “Tenant’s Share”, “Tenant’s Utility Costs”, “Permitted Use”, and “Premises”, respectively, shall be deemed to refer to Sublessor, Sublessee, this Sublease, the Sublease Term, Sublessee’s Parking Allocation, Sublessee’s Parking Charges, Sublessee’s Project Share, Sublessee’s Building Share, Sublessee’s Share, Sublessee’s Utility Costs, Permitted Use and the Premises subleased hereunder, respectively, *except that* all references in the following sections and/or provisions of the Prime Lease to “Landlord”, “Tenant”, “Lease”, and “Premises”, respectively, shall be deemed to refer to “Prime Lessor”, “Sublessee”, this “Sublease” and the “Premises subleased hereunder”, respectively (*i.e.*, it is the intention of the parties that Prime Lessor shall retain all of its rights and obligations under such sections and/or provisions; that Sublessor shall not be entitled to exercise any of Prime Lessor’s rights, nor shall be bound by any of Prime Lessor’s obligations, under such sections and/or provisions (subject to Section 2.2.4 below); and that Sublessee shall be entitled to exercise all of Tenant’s rights (with respect to the Premises), and shall be bound by all of Tenant’s obligations, under such sections and/or provisions):

(a) Section 2.3(b) (Parking);

(b) Section 7.10 (Landlord’s Access) (except that the rights under this section apply equally to Prime Lessor and Sublessor);

(c) Section 7.12 (Compliance with Rules and Regulations);

(d) Section 7.13 (Further Consideration); and

(e) Article IX (Rights of Mortgagees and Ground Lessors; Estoppel Certificates) (except that Sublessee will provide Sublessor with an estoppel certificate upon request in the same manner required of Sublessor as "Tenant" pursuant to Section 9.5).

(ii) the following sections and/or provisions of the Prime Lease are expressly excluded from this Sublease (i.e., they shall not be deemed to be incorporated in this Sublease) either because they are inapplicable or because they are superseded by specific provisions hereof:

(a) Summary of Basic Terms (except for the following terms, which shall be included in this Sublease: "Building", "Project", "Leasable Square Footage of the Building", "Leasable Square Footage of the Project", and "Other Additional Rent");

(b) Article 1 (Certain Definitions) (intending to exclude from this Sublease only the following definitions: "Allowance", "Base Rent", "Brokers", "FoldRx", "FoldRx Lease", "Genocea Sublease", "Rooftop Equipment", "Security Deposit", "Summary of Basic Terms (except as noted in (a) above)", and "Tenant Improvements");

(c) Section 2.2 (Common Rights) (intending to exclude from this Sublease the second to last sentence of this section only; provided that Sublessor will notify Sublessee of any consultations between Prime Lessor and Sublessor relating to any Amenity Facility pursuant to such Section 2.2);

(d) Section 2.5 (Security Deposit);

(e) Section 2.7 (Pre-Term Occupancy);

(f) Section 3.2 (Tenant Improvements; Allowance);

(g) Section 3.3 (Signs);

(h) Article IV (Base Rent; Additional Rent) (except that Sublessee shall be required to pay to Sublessor the following pursuant to Section 1.1 and Section 6.1 of this Sublease: Sublessee's Utility Costs, Sublessee's Building Share of Building Insurance Costs, Building Operating Costs, and Building Taxes, and Sublessee's Project Share of Project Insurance Costs, Project Operating Costs, and Project Taxes);

(i) Section 5.2 (Restrictions of Use) (intending to exclude from this Sublease this section only to the extent it relates to the vivarium, which is expressly not a Permitted Use of Sublessee);

(j) Section 5.3 (Hazardous Materials) (subsections (b) and (c) only);

(k) Section 5.4 (Rooftop Equipment);

(l) Section 6.1 (Landlord's Services);

(m) Section 6.2 (Extraordinary Use);

(n) Section 6.4 (Additional Services);

(o) Section 6.5 (Landlord's Indemnity; provided such exclusion is only intended to exclude Sublessor as indemnitor, and Section 6.5 shall continue in effect to the extent such indemnity applies in favor of Sublessee as a Person claiming through Sublessor);

(p) Section 7.4(b) (Rooftop Equipment)

(q) Section 7.5 (Alterations by Tenant) (except with respect to the reference to any terms or provisions of Section 7.5 in Section 7.1 of this Sublease);

(r) Section 7.6 (Trade Fixtures and Equipment);

(s) Article VIII (Subletting and Assignment) (except with respect to the reference to any terms or provisions of Article VIII in Section 5.2 of this Sublease);

(t) Article X (Casualty) (except with respect to the reference to any terms or provisions of Article X in Article 11 of this Sublease);

(u) Article XI (Eminent Domain) (except with respect to the reference to any terms or provisions of Article XI in Article 11 of this Sublease);

(v) Section 12.8 (Limitation of Landlord's Liability, as to the second sentence only);

(w) Section 13.1 (Brokers);

(x) Section 13.2 (Quiet Enjoyment);

(y) Section 13.4 (Notices);

(z) Section 13.14 (Summary of Basic Terms, except to the extent such terms are incorporated herein by Subsection 2.2(ii)(a) above);

(aa) Second Amendment to Lease, Section 2 (limiting such exclusion to the term "Existing Premises" only, it being the intention of Sublessor and Sublessee that the Existing Premises not be included in the Premises subleased hereunder, which are limited to the Expansion Premises);

(bb) Second Amendment to Lease, Section 3 (Condition of Expansion Premises, subject to Section 2.2.4 below);

(cc) Second Amendment to Lease, Section 4 (Expansion Termination Option);

(dd) Second Amendment to Lease, Section (Tenant's Building Share and Project Share);

(ee) Second Amendment to Lease, Section 6 (Security Deposit);

(ff) Second Amendment to Lease, Section 9 (Allowance);

(gg) Second Amendment to Lease, Section 10 (Extension Term); and

(hh) Second Amendment to Lease, Section 11 (Brokers).

Without limiting anything in Section 2.2.3 of this Sublease, in the event of a conflict between the express terms of this Sublease and the terms of the Prime Lease, the terms of this Sublease shall control.

**2.2.3** This Sublease is and shall remain subject and subordinate in all respects to the Prime Lease and to all renewals, modifications, consolidations, replacements and extensions thereof. This Section 2.2.3 shall be self-operative and no further instrument of subordination shall be required. In the event of termination or cancellation of the Prime Lease for any reason whatsoever with respect to all or any portion of the Premises, this Sublease shall automatically terminate with respect to all or such portion of the Premises (provided that if it is as to a material portion of the Premises such that Sublessee is unable to reasonably conduct its business operations in the remaining portion of the Premises, Sublessee will have the option to terminate this Sublease effective as of the date of such termination or cancellation) and Sublessee shall have no recourse against Sublessor for a termination or cancellation of the Prime Lease due to no fault of Sublessor.

**2.2.4** The water neutralizer system and generator serving the Premises are used exclusively by the Premises and not other premises in the Building. Sublessee is responsible for maintaining, repairing and replacing such neutralizer system and generator (subject to Section 2.2.1 above with respect to Major Capital Items), and obtaining any and all permits and approvals necessary to operate the water neutralizer system and generator, including a permit

from the Massachusetts Water Resources Authority with respect to the water neutralizer system. Sublessee agrees to retain EMCOR as its maintenance and repair contractor for the HVAC system serving the Premises so long as EMCOR's charges are commercially reasonable and consistent with the Cambridge market. Except as set forth herein, Sublessor shall have no obligation during the Sublease Term to provide any services of any nature whatsoever to Sublessee or to, in or for the benefit of the Premises or to expend any money for the preservation or repair of the Premises, or to observe or perform any obligations of Sublessor under this Sublease in any case where such services, expenditures or obligations are required under the Prime Lease to be provided, performed or observed by Prime Lessor for the benefit of Sublessor with respect to the Premises, and, subject to this Section 2.2.4 below, Sublessee agrees to look solely and directly to Prime Lessor for the furnishing of any such services, expenditure of any such sums, or observance or performance of any such obligations to which, or the benefit of which, Sublessee may be entitled under this Sublease, but nothing in the foregoing shall be deemed to exculpate or otherwise release Sublessor from, or prevent Sublessee from looking directly to Sublessor for, any liability arising out of Sublessor's negligence or willful misconduct or the failure of Sublessor to perform its express obligations hereunder. Sublessor shall, however, upon the written request of Sublessee from time to time, use due diligence and reasonable efforts to cause Prime Lessor to furnish such services, expend such sums, and observe and perform such obligations, which such due diligence and reasonable efforts shall be limited to notifying Prime Lessor in writing of Sublessee's request, and if Sublessor, reasonably and good faith, believes that Prime Lessor has defaulted under its obligations in the Prime Lease, to send one (1) notice of default to Prime Lessor and to otherwise cooperate, at no out-of-pocket cost to Sublessor, with Sublessee to enforce the Prime Lease; provided that Sublessor will not be obligated to threaten or commence litigation against Prime Lessor, nor do anything which it believes in good faith would jeopardize Sublessor's leasehold interest. Sublessor's only obligations under the Prime Lease with respect to the Premises are to use the aforesaid due diligence and reasonable efforts, make those payments of all rent and other charges due to Prime Lessor thereunder and to make those payments due to the utility providers for utility services (including electricity, water and sewer) which are separately metered to the Premises, if any, which payments Sublessor hereby agrees to make; *provided, however*, that Sublessee makes timely payment to Sublessor of all Base Rent and Additional Rent payable under this Sublease and to perform such other actions as are expressly required of Sublessor pursuant to this Sublease. Sublessor hereby agrees that, so long as Sublessee makes timely payment to Sublessor of all Base Rent and Additional Rent payable by Sublessee hereunder, Sublessor shall make timely payment of all rent and other charges due to Prime Lessor as landlord under the Sublease. Subject to the terms and conditions of this Sublease, it is the intention of the parties that Sublessee comply with all of Sublessor's obligations as tenant under the Prime Lease with respect to the Premises during the Sublease Term to the same extent and with the same force and effect as if Sublessee were tenant thereunder, and Sublessee hereby agrees to so comply with all such obligations of Sublessor under the Prime Lease with respect to the Premises during the Sublease Term to the extent required by this Sublease. Sublessee shall have no claim against Sublessor for any default by the Prime Lessor under the Prime Lease; provided that the foregoing shall not limit Sublessee's claims against Sublessor for any breach by Sublessor under this Sublease. If as a result of any default by Prime Lessor as landlord under the Prime Lease, Sublessor as tenant under the Prime Lease is entitled to any offset or similar rights against Prime

Lessor, Sublessee shall be entitled to a fair and equitable share of such offset or similar rights. No default by Prime Lessor under the Prime Lease shall excuse Sublessee from the performance of any of its obligations to be performed under this Sublease or to any reduction in or abatement of any of the rent provided for in this Sublease, unless and only to the extent that Sublessor shall be excused from the performance of a corresponding obligation as the "Tenant" under the Prime Lease. For clarity, Sublessee shall not be liable, and nothing in this Sublease is intended or will be construed to make Sublessee responsible or liable for any acts or liability of Sublessor which accrued or applies to acts or omissions prior to the commencement of or after the expiration or earlier termination of the Sublease Term (including, without limitation, restoration obligations for improvements or alterations installed prior to the Sublease Term), and in no event will Sublessee be responsible for the acts or omissions of Sublessor or its Invitees, regardless of when such acts or omissions occur.

**2.2.5** Sublessee and its Invitees shall neither do, nor permit to be done, anything that would increase Sublessor's obligations to the Prime Lessor under the Prime Lease (except to the extent permitted by this Sublease) or that would cause the Prime Lease to be defaulted, terminated or forfeited. Sublessor shall not amend or modify the Prime Lease in any way that would increase Sublessee's obligations or diminish Sublessee's rights under this Lease, nor shall Sublessor or its Invitees do, nor permit to do or be done, anything that would cause the Prime Lease to be defaulted, terminated or forfeited.

**2.2.6** Sublessor shall promptly give Sublessee a copy of any notice of default, termination or otherwise under the Prime Lease (to the extent relating to the Premises) or otherwise affecting the existence or validity of the Sublease or relating to any casualty or taking, given by Sublessor or Prime Lessor to the other.

## Article 3

## TERM OF SUBLEASE

### 3.1 TERM

**3.1.1** The Sublease Term of this Sublease shall be for the period specified in Section 1.1 as the Sublease Term. Notwithstanding the foregoing, in the event that Prime Lessor has delivered its written consent to this Sublease, but the Premises are not delivered to Sublessee in the Delivery Condition on or before February 1, 2021 (subject to any delays due to Force Majeure (as hereinafter defined)), then Sublessor shall abate Sublessee's obligation to pay Base Rent for the number of days from February 1, 2021 through the actual date of delivery of the Premises in the Delivery Condition, and such abatement shall be applied to the monthly Base Rent next payable under this Sublease after the Commencement Date.

**3.1.2** Sublessee shall have the right to extend the Sublease Term for the Option Term specified in Section 1.1 on the same terms and conditions of this Sublease other than Base Rent which shall continue to increase in accordance with the schedule set forth in Section 1.1. Sublessee may exercise such right to extend by providing Sublessor with no less than six (6) months' written notice prior to the expiration of the then-current Sublease Term.

**3.1.3** Sublessee shall have the right to request to extend the Sublease Term for the three (3) Extension Terms specified in Section 1.1 on the same terms and conditions of this Sublease other than Base Rent, which shall continue to increase in accordance with the schedule set forth in Section 1.1. Sublessee may request any such Extension Term in writing to Sublessor at least six (6) months prior to the expiration of the then-current Sublease Term. Sublessor, in its sole and absolute discretion, may either accept or deny such request by written notice to Sublessee within thirty (30) days of such request. Sublessor's failure to timely accept or deny any such request shall be deemed a denial thereof.

**3.1.4** Sublessor shall provide Sublessee with access to the laboratory portion of the Premises within five (5) business days after Prime Lessor's written consent to this Sublease, but in any case, not earlier than December 1, 2020, for the purposes of installing its equipment and making inspections of the HVAC systems, life-safety systems, electrical, and plumbing (all of which shall be subject to Article 7 of this Sublease); provided, however, that Sublessee shall have no right to operate its business in the Premises prior to the Commencement Date. Sublessor shall use commercially reasonable efforts to provide such early access on or before December 1, 2020. Such early access shall be subject to all the terms and conditions of this Sublease, other than the payment of Base Rent, any Sublessee's Utility Costs for the office portion of the Premises (it being understood that Sublessee shall pay a pro rata share of Sublessee's Utility Costs for the laboratory portion of the Premises during such early access period), Sublessee's Project Share of Project Taxes, Project Insurance Costs, or Project Operating Costs, Sublessee's Building Share of Building Taxes, Building Insurance Costs, or Building Operating Costs, or Sublessee's Parking Charges, and shall be conditioned on Sublessee delivering the certificates of insurance required under Section 10.1, below prior to any such early access.

## Article 4

## CONDITION OF PREMISES

### 4.1 CONDITION OF PREMISES

Sublessee acknowledges that it has accepted the Premises "AS IS", in the order and condition as the Premises are in on the date hereof; and that Sublessee shall accept the Premises in the condition that it is in as of the Commencement Date, broom clean, free of Sublessor's personal property and any Hazardous Materials, other than the personal property and equipment as shown on **Exhibit C** which will remain in place; provided that the office furniture and other personal property located within the laboratory portion of the Premises as of the Execution Date shall be removed by Sublessor prior to the Commencement Date (collectively, the "Delivery Condition"). Sublessee hereby agrees that Sublessor is under no obligation to perform any work upon or alteration to any part of the Premises for Sublessee's use and occupancy thereof. Sublessor has provided Sublessee with a decommissioning report entitled "Laboratory Decommissioning Report for Fog Pharma, 100 Acorn Park Drive, Sixth Floor, Cambridge, MA 02140", prepared by Triumvirate Environmental, dated March 18, 2020 with respect to the Premises (the "Triumvirate Report"). Sublessor represents and warrants that no Hazardous Materials have been used in the Premises since the date that Sublessor took possession of the

Premises. Upon expiration or earlier termination of the Sublease Term, Sublessee will surrender and deliver the Premises to Sublessor broom clean, free of Sublessee's personal property and trade fixtures and any Hazardous Materials brought onto the Premises by Sublessee and in compliance with the requirements of Section 5.3(a) of the Prime Lease relating to the removal of Hazardous Materials (including, without limitation, the 5th sentence of such Section 5.3(a), except that with respect to such sentence, the phrase "as of the date of this Lease" shall mean "as of the Sublease Term Commencement Date"), and otherwise in its condition existing as of the Commencement Date (subject to any alterations which Sublessee installs and is permitted to leave in place pursuant to Section 7.1), reasonable wear and tear excepted. Additionally, upon expiration or earlier termination of the Sublease Term, Sublessee shall be required to deliver a report in substantially the form of the Triumvirate Report. For clarity, all of Sublessee's trade fixtures and equipment installed in the Premises by Sublessee will be and remain the property of Sublessee (and Sublessee shall be responsible to repair any damage to the Premises following the removal of any such trade fixtures and equipment), and Sublessee shall have no liability for any Hazardous Materials which existed prior to the date Sublessee first occupies the Premises, including without limitation any use or occupancy of the Premises by Sublessee prior to the Sublease Term.

**4.2 FIXTURES AND EQUIPMENT**

Sublessee shall be entitled to use all personal property, furniture, built-in fixtures and equipment physically located in the Premises as of the Commencement Date, a schedule of which is attached hereto as **Exhibit C**. Sublessee shall, at its expense, maintain and repair such personal property, furniture, fixtures and equipment in good order, repair and condition (provided that Sublessee will not be required to upgrade any of such fixtures and equipment to a condition better than received) and shall surrender all such fixtures and equipment to Sublessor in such condition at the end of the Sublease Term, reasonable wear and tear excepted. Sublessee shall use and operate all furniture, personal property and equipment in the Premises in accordance with industry standards and in a first-class professional manner and shall not commit any waste thereto.

## Article 5

## USE

**5.1 PERMITTED USE**

Sublessee agrees that the Premises shall be used and occupied for the Permitted Uses specified in Section 1.1 only. During the Sublease Term, Sublessee shall assume and maintain exclusive control of the Premises. Sublessee acknowledges and understands that Sublessee shall be responsible, at its expense, for providing any janitorial, cleaning, equipment and fixture maintenance and security services necessary for Sublessee's use and occupancy of the Premises not otherwise provided by Prime Lessor under the Prime Lease. Sublessee shall not permit the emission of objectionable noise or odor from the Premises.

**5.2 ASSIGNMENT AND SUBLETTING**

Sublessee shall not, by operation of law or otherwise, assign, mortgage, pledge, encumber or in any manner transfer this Sublease, or any part thereof or any interest of Sublessee hereunder, or sublet or permit the Premises or any part thereof to be used or occupied by others, without the prior consent of both Sublessor and Prime Lessor. Sublessee shall comply with all of the terms and provisions of Article VIII of the Prime Lease with respect to any proposed assignment or sublease. Sublessor agrees that it shall not unreasonably withhold or delay its consent to any assignment or further sublease provided that Sublessor may withhold or condition its consent for any reason that Prime Lessor is permitted to withhold or condition its consent under Article VIII of the Prime Lease; provided that notwithstanding anything to the contrary contained herein, no consent of Sublessor will be required for a transfer to a Permitted Transferee so long as such Permitted Transferee has a net worth that is equal to (a) the net worth of Sublessee as of the date of this Sublease or (b) the net worth of Sublessee as of the date of any such transfer to a Permitted Transferee, whichever is greater. Notwithstanding any such consent, Sublessee shall remain liable to Sublessor for the payment of all Base Rent, Additional Rent and for the performance of the covenants and conditions of this Sublease (which liability, following any assignment, shall be joint and several with the assignee). Sublessee shall be obligated to pay to Sublessor all of Sublessor's reasonable costs and expenses arising out of any request of Sublessee to sublet or assign this Sublease, including without limitation, reasonable attorney's fees.

**Article 6**

**RENT**

**6.1 BASE RENT; ADDITIONAL RENT**

**6.1.1** The Base Rent and Additional Rent specified in Section 1.1 hereof (collectively, the "Rent"), and any additional rent or other charges payable pursuant to this Sublease shall be payable by Sublessee to Sublessor at the Mailing Address of Sublessor set forth in Section 1.1 (or such other place as Sublessor may from time to time designate by notice to Sublessee). Additional Rent will be payable at the same time as the corresponding Additional Rent payments under the Prime Lease. Sublessor will provide copies of any statements received from Prime Lessor relating to any of Building Taxes, Building Insurance Costs, and Building Operating Costs or Project Taxes, Project Insurance Costs and Project Operating Costs, and will request additional information from Prime Lessor in support of such statements if reasonably requested by Sublessee. The parties acknowledge and agree that the obligations owing by Sublessee under this Section are rent reserved under this Sublease, for all purposes hereunder, and are rent reserved within the meaning of Section 502(b)(6) of the Bankruptcy Code or any successor provisions thereto.

**6.1.2** Rent shall be payable, in advance, on or before the first (1st) day of each and every calendar month during the term of this Sublease; provided that Sublessee, not more than once per any twelve (12) month period, will not be in default under this Sublease unless it fails to make

any Rent payment for more than three (3) days after it receives written notice that any payment of Rent is past due. Promptly (but in no event more than thirty (30) days) after Sublessor and Prime Lessor have made the appropriate adjustments between themselves on account of such actual operating expenses and real estate taxes, the amounts paid by Sublessee as Sublessee's Share of such estimated installments (as set forth in Section 1.1) shall be adjusted between Sublessor and Sublessee. The parties' obligations hereunder to make such adjustments shall survive the expiration or termination of this Sublease. Notwithstanding anything in this Section 6.1.2 to the contrary, in the event that Sublessor receives from Prime Lessor written demand for any owed Project Taxes, Project Insurance Costs, Project Operating Costs, Building Taxes, Building Insurance Costs, or Building Operating Costs pursuant to Article IV of the Prime Lease, Sublessee shall pay Sublessee's Share thereof within thirty (30) days of written demand by Sublessor.

**6.1.3** Rent for any partial month shall be paid by Sublessee to Sublessor on a pro rata basis.

**6.1.4** Except as expressly provided in this Sublease, all Rent and other amounts due under this Sublease shall be made without demand, offset or deduction. Sublessee shall be entitled to a fair and equitable share of all rent abatements set forth in the Prime Lease, if any, which Sublessor has been granted with respect to the Premises.

### 6.2 LATE PAYMENTS; ADDITIONAL RENT

If any installment of Rent, Additional Rent or other charges is not paid on or before the date such payment is due and payable, and if as a result Sublessor is obligated to pay to Prime Lessor the late charges or interest specified in Section 12.9 of the Prime Lease or any other late charge or penalty, then Sublessee shall pay to Sublessor a late charge of three percent (3%) greater than any late charge, fee or payment that Prime Lessor charges to Sublessor. In addition, if Sublessee shall fail to make any such payment within five (5) days after the due date (or any such shorter grace period that may be provided under the Prime Lease for the failure to pay any amounts), such payment shall bear interest at the rate per annum which is two percent (2%) more than the rate that Prime Lessor may charge Sublessor under Section 12.9 of the Prime Lease, provided, however, that nothing contained herein shall be construed as permitting Sublessor to charge or receive interest in excess of the maximum legal rate than allowed by law. Such late charge and interest shall constitute Additional Rent due and payable hereunder with the next installment of Base Rent due hereunder.

## Article 7

## ALTERATIONS

### 7.1 ALTERATIONS

Sublessee shall not make any alterations, installations, and improvements to the Premises without first obtaining the prior consent of both Sublessor and Prime Lessor, and any such approved alterations, installations and improvements shall comply with Section 7.5 of the Prime

Lease, and Sublessee shall be obligated to comply with the terms and provisions of Section 7.5 as required by "Tenant" thereunder. Sublessor shall not be responsible for the failure or refusal of Prime Lessor to consent to such improvements but will use diligent and reasonable efforts to obtain such consent (which such diligent and reasonable efforts shall be limited to notifying Prime Lessor in writing of such request and cooperating with Sublessee and Prime Lessor in obtaining such consent). Any such approved alterations, additions or improvements shall be done at Sublessee's sole expense in a good and workmanlike manner and in compliance with all applicable laws and codes and the applicable requirements of the Prime Lease. At the time of its approval of any such alterations, Sublessor shall notify Sublessee if Sublessee shall be required to remove the same upon the expiration or earlier termination of the Sublease Term; provided; however, that if neither Sublessor nor Prime Lessor notifies Sublessee otherwise at the time of such approval, such alterations shall become the property of Prime Lessor and remain upon and be surrendered with the Premises. Notwithstanding the exclusion of Section 5.4 of the Prime Lease from this Sublease pursuant to Section 2.2.2(ii) above, Sublessee shall not make any installations or alterations to the roof of the Building without complying with the terms and provisions of Section 5.4 and Section 7.4(b) of the Prime Lease, in addition to the terms and provisions of this Section 7.1. Upon the expiration or earlier termination of the Sublease Term, Sublessee shall not be required to remove any improvements located in the Premises as of the Commencement Date. Sublessor has approved in concept the planned alterations to be performed by Sublessee (attached hereto as **Exhibit E**), specifically including the addition of four (4) fume hoods; provided that Sublessor will have the right to review and approve the detailed drawings for such alterations and such alterations will be subject to the approval of Prime Lessor.

## Article 8

## SUBLESSEE'S RISK; WAIVER

### 8.1 SUBLESSEE'S RISK

Sublessee agrees to use and occupy the Premises at Sublessee's own risk; and to the fullest extent permitted by law, Sublessor shall have no responsibility or liability for any loss of or damage to fixtures or other personal property of Sublessee, or of those claiming by, through or under Sublessee, including without limitation, any loss or damage from the breaking, bursting, crossing, stopping or leaking of electric cables and wires, and water, gas, sewer or steam pipes or like matters, except to the extent directly caused by the gross negligence or willful misconduct of Sublessor or its Invitees and subject to Massachusetts General Laws Chapter 186, § 15.

### 8.2 INDEMNITY AND WAIVER

Sublessor will not voluntarily do, or fail to do, anything which will constitute a default under the Prime Lease or permit the Prime Lease to be terminated for any reason; provided, however, that Sublessor shall not be liable to Sublessee for any such termination relating to any default of Sublessee under this Sublease. Sublessor hereby agrees to defend, indemnify and hold harmless Sublessee from and against any and all claims, actions, liabilities, losses, damages,

costs and expenses (including, without limitation, reasonable attorneys' fees and disbursements) ("Claims") arising from Sublessor's breach of the Prime Lease (including specifically Section 5.3) or any material provisions of this Sublease, including, without limitation, the provisions of this Section 8.2, unless such breach arises from the actions or omissions of Sublessee or its Invitees. The foregoing indemnity will survive the expiration of this Sublease.

In no event shall Sublessor or Sublessee be liable for any consequential, special, punitive or indirect loss or damage which the other party may incur or suffer in connection with this Sublease or any services to be performed or provided hereto.

## Article 9

## SUBLESSOR'S ACCESS TO PREMISES

### 9.1 SUBLESSOR'S RIGHT OF ACCESS

If Sublessee fails to make any necessary repairs to the Premises within a reasonable time after notice thereof from Sublessor (in no event less than the applicable notice and cure period for non-monetary defaults, if any), Sublessor shall have the right to enter the Premises at all reasonable hours for the purpose of making such repairs, at Sublessee's cost and expense.

## Article 10

## INSURANCE

**10.1 SUBLESSEE'S INSURANCE**

Sublessee shall maintain throughout the Term of this Sublease such insurance in respect of the Premises and the conduct and operation of Sublessee's business in the Premises, with Sublessor and Prime Lessor listed as additional insureds as is required of "Tenant" under the terms of the Prime Lease (including, without limitation, Section 7.9 as incorporated in this Sublease by reference). If Sublessee fails to procure or maintain such insurance, pay all premiums and charges therefor and provide Sublessor with certificate(s) of such insurance within five (5) business days of written notice, then Sublessor may (but shall not be obligated to) do so, whereupon Sublessee shall reimburse Sublessor upon demand for Sublessor's costs incurred in so doing. All such insurance policies shall, to the extent obtainable at commercially reasonable rates, contain endorsements providing that (i) such policies may not be canceled except upon at least thirty (30) days' prior notice to Sublessor and Prime Lessor, (ii) no act or omission of Sublessee shall affect or limit the obligations of the insurer with respect to any other named or additional insured and (iii) Sublessee shall be solely responsible for the payment of all premiums under such policies and Sublessor, notwithstanding that it is or may be named as an additional insured, shall have no obligation for the payment of any insurance premiums. No less than ten (10) days before the Commencement Date, Sublessee shall deliver to Sublessor and Prime Lessor a certificate evidencing the coverages required by Section 7.9 of the Prime Lease. Any endorsements to such certificates shall also be delivered to Sublessor and Prime Lessor promptly upon issuance of such certificates. Sublessee shall procure and pay for renewals of such insurance from time to time before the expiration of such insurance, and Sublessee shall deliver to Sublessor and Prime Lessor such renewal certificates at least thirty (30) days before the expiration of any existing policy. If Sublessee fails so to deliver any such renewal certificate at least thirty (30) days before the expiration of any existing policy, then, in addition to its other rights and remedies in respect of such breach of this Sublease by Sublessee, Sublessor shall have the right, but not the obligation, to obtain such insurance on Sublessee's behalf, whereupon Sublessee shall reimburse Sublessor upon demand for Sublessor's costs incurred in so doing.

Sublessee shall include in all insurance policies required to be maintained under this Sublease any clauses or endorsements in favor of Prime Lessor including, but not limited to, waivers of the right of subrogation, which Sublessor is required to provide as "Tenant" under the provisions of the Prime Lease. Sublessor and Sublessee mutually release and waive all claims against one another for loss or damage to the waiving party's personal property and its alterations in the Premises to the extent that any loss or damage is insurable under policies of casualty insurance the waiving party carries or is required to carry under the Prime Lease or this Sublease. As part of Prime Lessor's consent to this Sublease, Prime Lessor will agree to waive subrogation claims against Sublessee to the extent it waives such claims against Sublessor under Section 13.5 of the Prime Lease.

## Article 11

## CASUALTY

**11.1 CASUALTY AND RESTORATION; EMINENT DOMAIN**

If the Premises, or any part thereof, shall be damaged or destroyed by fire or other casualty or subject to a taking by eminent domain then Sublessee shall promptly notify Prime Lessor and Sublessor. Under the Prime Lease, the Prime Lessor is obligated to repair or restore the Premises in the case of a casualty to the extent and in the manner set forth in Article X of the Prime Lease. With respect to an eminent domain taking, the Prime Lease shall terminate pursuant to Article XI thereof. If Prime Lessor abates Sublessor's rent with respect to the Premises as a result of any casualty or condemnation, then Rent and other charges hereunder shall be similarly abated for so long as Sublessor is entitled to and receives an abatement under the Prime Lease. If damage is of the type which entitles Prime Lessor or Sublessor to terminate the Prime Lease, and if Prime Lessor or Sublessor elects to do so, then the Prime Lease shall cease and come to an end and this Sublease shall similarly terminate. Sublessee acknowledges that Sublessor shall, in no event, have any obligation whatsoever to rebuild or restore any damage to the Premises. If there is a casualty event and the Premises is unusable, and the damage will take longer than 180 days to repair, then Sublessee may terminate this Sublease by delivery of written notice to Sublessor.

**Article 12**

**DEFAULT**

**12.1 EVENTS OF DEFAULT**

This Sublease and the Sublease Term are subject to the limitation that Sublessee shall be in default if, at any time during the Term of this Sublease, (i) Sublessee breaches any one or more of the covenants, obligations or requirements of Sublessee under this Sublease or (ii) any of the events set forth in Section 12.1 of the Prime Lease, which is incorporated into this Sublease pursuant to Section 2.2.2 of this Sublease, shall occur and, in the case of default under either of the foregoing clauses (i) or (ii), is not be cured prior to the expiration of the grace period (if any) set forth in Section 12.1 of the Prime Lease, which is incorporated into this Sublease pursuant to Section 2.2.2 of this Sublease (provided, however, that any grace period for non-monetary defaults provided in Section 12.1 of the Prime Lease shall be five (5) calendar days shorter for any breach of any covenant, obligation or requirement of this Sublease) (such uncured event being hereinafter referred to as an "Event of Default").

**12.2 REMEDIES**

Upon the happening of any one or more of the aforementioned Events of Default, and without limiting any other right or remedy that may be available at law or in equity, Sublessor shall have, and may exercise, any or all of the rights provided to Prime Lessor under the Prime Lease, including without limitation Article XII thereof.

## Article 13

## MISCELLANEOUS PROVISIONS

### 13.1 SIGNAGE

Subject to Prime Lessor's prior written consent, Sublessee shall have the right, at Sublessee's sole cost and expense, to have its name installed on the tenant directory at the main entrance of the Building, and subject to Prime Lessor's and Sublessor's prior written consent (which, with respect to Sublessor, shall not be unreasonably withheld, conditioned or delayed), Sublessee, at its sole cost and expense, shall have the right to install signage at the entrance to the Premises with a location, size, design, and logo acceptable to Prime Lessor in its sole and absolute discretion. Except for the signage permitted by this Section 13.1, Sublessee shall not erect any signs which are visible from the exterior of the Building, or that are not in compliance with applicable Legal Requirements. Upon the expiration or earlier termination of the Sublease Term, Sublessee shall promptly remove all Sublessee's signage at the exterior of the Premises or otherwise approved by Prime Lessor and Sublessee, and restore all damage related to the installation, existence, and/or removal of such signage.

### 13.2 WAIVER

Failure on the part of either party to complain of any action or nonaction on the part of the other, no matter how long the same may continue, shall never be deemed to be a waiver by such party of any of its rights hereunder. Further, it is agreed that no waiver of any of the provisions hereof by either party shall be construed as a waiver of any of the other provisions hereof and that a waiver at any time of any of the provisions hereof shall not be construed as a waiver at any subsequent time of the same provisions. The consent to or approval of any action by either party requiring such consent or approval shall not be deemed to waive or render unnecessary such consent to or approval of any subsequent similar act by such party.

### 13.3 COVENANT OF QUIET ENJOYMENT

Sublessee, subject to the terms and provisions of this Sublease, on payment of the Rent and observing, keeping, and performing all of the terms and provisions of this Sublease on Sublessee's part to be observed, kept, and performed, shall lawfully, peaceably, and quietly have, hold, occupy, and enjoy the Premises during the Sublease Term without hindrance or ejection by Sublessor or by any person lawfully claiming under Sublessor; the foregoing covenant of quiet enjoyment is given in lieu of any other covenant, whether express or implied.

### 13.4 INDEPENDENT COVENANTS

***The obligations of Sublessor and Sublessee, respectively, under this Sublease are agreed by the parties to be independent covenants. If Sublessor fails to perform any obligation under this Sublease required to be performed by Sublessor, Sublessee shall have no right to (i) terminate this Sublease, (ii) avail itself of self-help or to perform any obligation of Sublessor,***

***(iii) abatement or withholding of Rent, or any other charges or sums payable by Sublessee under this Sublease; or (iv) any right of setoff.***

**13.5 COUNTERPARTS; ELECTRONIC SIGNATURES**

This Sublease may be executed in counterparts, each of which shall be fully effective and all of which together shall constitute one and the same instrument. The parties agree that electronic signatures, including those delivered by PDF or signed through the electronic signature system known as "DocuSign", shall have the same effect as originals. All parties to this Sublease waive any and all rights to object to the enforceability of this Sublease based on the form or delivery of signature.

**13.6 INVALIDITY OF PARTICULAR PROVISIONS; TIME IS OF THE ESSENCE**

If any term or provision of this Sublease, or the application thereof to any person or circumstance, shall, to any extent, be invalid or unenforceable, the remainder of this Sublease, or the application of such term or provision to persons or circumstances other than those as to which it is held invalid or unenforceable, shall not be affected thereby, and each term and provision of this Sublease shall be valid and be enforced to the fullest extent permitted by law. Time is of the essence of each provision of this Sublease.

**13.7 BROKERS**

Each party represents and warrants to the other that it has not directly or indirectly dealt, with respect to the Premises and this Sublease with any broker other than the Brokers identified in Section 1.1 (the “Brokers”). Each party shall save harmless and indemnify the other party against any claims by anyone with whom it has so dealt or by whom its attention was called to the Premises, other than the Brokers, for a commission arising out of the execution and delivery of this Sublease or out of negotiations between Sublessor and Sublessee with respect to space in the Buildings. Sublessor agrees to pay the Brokers the commission with respect to this Sublease set forth in a separate agreement between Sublessor and the Brokers.

**13.8 PROVISIONS BINDING, ETC.**

Except as herein otherwise expressly provided, the terms hereof shall be binding upon and shall inure to the benefit of the heirs, legal representatives, successors and assigns, respectively, of Sublessor and Sublessee. Each term and each provision of this Sublease to be performed by Sublessee shall be construed to be both a covenant and a condition. The reference contained to the successors and assigns of Sublessee is not intended to constitute a consent to assignment by Sublessee, but has reference only to those instances in which Sublessor shall have given its consent to a particular assignment if such consent is required by the provisions of this Sublease. Each person executing this Sublease on behalf of Sublessor warrants that Sublessor is a duly existing and valid Delaware limited liability company qualified to do business in Massachusetts, that Sublessor has duly executed and delivered this Sublease, that the execution

and delivery of, and the performance by Sublessor of its obligations under this Sublease are within the powers of Sublessor and have been duly authorized by all requisite corporate action, and that this Sublease is a valid and binding obligation of Sublessor in accordance with its terms. Each of the persons executing this instrument on behalf of the Sublessee (each acting in his or her capacity as an employee of Sublessee and not in his or her personal capacity) hereby covenant and warrant that the Sublessee is a duly existing and valid Delaware corporation qualified to do business in Massachusetts, that Sublessee has duly executed and delivered this Sublease, that the execution and delivery of, and the performance by Sublessee of its obligations under this Sublease are within the powers of Sublessee and have been duly authorized by all requisite action, and that the Sublease is a valid and binding obligation of Sublessee in accordance with its terms.

**13.9 NO RECORDING**

Sublessee agrees not to record this Sublease or any notice thereof.

**13.10 NOTICES**

Whenever by the terms of this Sublease notice, demand or other communication shall or may be given, either to Sublessor or to Sublessee, the same shall be adequately given if in writing and delivered by hand or sent by registered or certified mail, postage prepaid or by a reputable overnight delivery service:

If intended for Sublessor, at the Mailing Address of Sublessor set forth in Section 1.1, and at all times with a courtesy copy to David L. Wiener, Esq., Anderson & Kreiger LLP, 50 Milk Street, 21st Floor, Boston, Massachusetts 02109 (or to such other address or addresses as may from time to time hereafter be designated by Sublessor by like notice).

If intended for Sublessee, addressed to it prior to the Commencement Date at the Present Mailing Address of Sublessee set forth in Section 1.1, and after the Commencement Date, at the Mailing Address of Sublessee as of the Commencement Date set forth in Section 1.1. (or to such other address or addresses as may from time to time hereafter be designated by Sublessee by like notice).

All such notices shall be effective upon receipt or refusal to receive.

**13.11 SECURITY DEPOSIT**

Within five (5) business days after the execution of this Sublease and receipt of Prime Lessor's consent hereto, Sublessee shall deliver the Security Deposit to Sublessor in the form of a clean, irrevocable, non-documentary and unconditional letter of credit in the amount of the Security Deposit in the form attached hereto as **Exhibit D** (the "Letter of Credit") issued by and drawable upon any commercial bank, trust company, national banking association or savings and loan association with offices for banking and drawing purposes in Boston, Massachusetts or other location provided such bank allows drawing by facsimile (the "Issuing Bank"), which has

outstanding unsecured, uninsured and unguaranteed indebtedness, that is then rated, without regard to qualification of such rating by symbols such as "+" or "-" or numerical notation, "Aa" or better by Moody's Investors Service and "AA" or better by Standard & Poor's Ratings Service (and is not on credit-watch with negative implications), and has combined capital, surplus and undivided profits of not less than $1,000,000,000; provided that Sublessor hereby approves Silicon Valley Bank as the issuer of the Letter of Credit. The Letter of Credit shall (i) name Sublessor as beneficiary, (ii) be in the amount of the Security Deposit, (iii) have a Term of not less than one year, (iv) permit multiple drawings, (v) be fully transferable by Sublessor in connection with its transfer of its entire interest in the Sublease only multiple times without the consent of Sublessee and without the payment of any fees or charges, (vi) be payable to Sublessor or an authorized representative of Sublessor upon presentation of only the Letter of Credit and a sight draft and a certification of Sublessor (acceptable to Sublessor in its sole discretion) as to the existence of an Event of Default of Sublessee (provided that the certification language contained in **Exhibit D** is hereby approved by Sublessor), and (vii) otherwise be in form and content reasonably satisfactory to Sublessor (provided that **Exhibit D** is hereby approved). If upon any transfer of the Letter of Credit, any fees or charges shall be so imposed, then such fees or charges shall be payable solely by Sublessee and the Letter of Credit shall so specify. The Letter of Credit shall provide that it shall be deemed automatically renewed, without amendment, for consecutive periods of one year each thereafter during the Term through the date that is at least sixty (60) days after the last day of the Term of this Sublease, unless the Issuing Bank sends a notice (the "Non-Renewal Notice") to Sublessor by certified mail, return receipt requested, not less than thirty (30) days prior to the then-current expiration date of the Letter of Credit, stating that the Issuing Bank has elected not to renew the Letter of Credit. Sublessor shall have the right, upon receipt of a Non-Renewal Notice, to draw the full amount of the Letter of Credit, by sight draft on the Issuing Bank, and shall thereafter hold or apply the cash proceeds of the Letter of Credit pursuant to the terms of this Section 13.11. The Letter of Credit shall state that drafts drawn under and in compliance with the terms of the Letter of Credit will be duly honored upon presentation to the Issuing Bank at an office location in Boston, Massachusetts or other location by facsimile. The Letter of Credit shall be subject in all respects to the International Standby Practices current as of the date of this Sublease, International Chamber of Commerce Publication No. 590. Sublessee shall cooperate, at Sublessee's expense, with Sublessor to promptly execute and deliver to Sublessor any and all modifications, amendments and replacements of the Letter of Credit, as Sublessor may reasonably request to carry out the intent, terms and conditions of this Section 13.11.

If Sublessee defaults with respect to any provision of this Sublease, including any provision relating to the payment of Rent, then Sublessor may (but shall not be required to) draw upon the Letter of Credit, and hold and apply the proceeds for the payment of any Rent or any other sum in default, or to compensate Sublessor for any other loss or damage that Sublessor actually suffers by reason of Sublessee's default. The Letter of Credit or any remaining proceeds of the Letter of Credit held by Sublessor after expiration of the Sublease Term, after any deductions described in this Section 13.11 above, shall be returned to Sublessee or, at Sublessor's option, to the last assignee of Sublessee's interest hereunder, within thirty (30) days following the expiration of the Sublease Term.

If (a) this Sublease is terminated prior to the expiration of the Term by mutual written agreement of Sublessor or Sublessee, (b) the Prime lease is terminated by reason of a default by Sublessor (where Sublessee is not in default under this Sublease) or (c) if Sublessee receives a nonappealable court order from a court of competent jurisdiction that the Sublease is terminated, the Letter of Credit will be cancelled and Sublessor agrees that the issuing bank may cancel such Letter of Credit without any further action from Sublessor. Sublessor agrees to cooperate with any requests from Sublessee pursuant to this paragraph relating to the cancellation of the Letter of Credit.

**13.12 FORCE MAJEURE.**

"Force Majeure" means accidents; breakage; casualties; physical natural disasters; strikes, lockouts or other labor disturbances or labor disputes (other than labor disturbances and labor disputes resulting solely from the acts or omissions of the party claiming Force Majeure); acts of terrorism; riots or civil disturbances; wars or insurrections; epidemics or pandemics; shortages of materials (which shortages are not unique to the party claiming Force Majeure); regulations, moratoria or other actions, inactions or delays by governmental authorities, provided that any delay by a governmental authority in issuing any required permit or approval is not caused by the failure of the party claiming Force Majeure to timely submit a complete application for such permit or approval in compliance with Legal Requirements; failures by third parties to deliver gas, oil or another suitable fuel supply, or inability of the party claiming Force Majeure, by exercise of reasonable diligence, to obtain gas, oil or another suitable fuel; or other causes beyond the reasonable control of the party claiming that Force Majeure has occurred. Notwithstanding anything in this Sublease to the contrary, events of Force Majeure shall excuse timely performance of a party hereunder (other than either party's obligation to pay any amounts hereunder, which shall not be excused by Force Majeure) for a period equal to the delay caused thereby and, therefore, if this Sublease 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 an event of Force Majeure. Each party claiming any delay as a result of Force Majeure shall notify the other party in writing within ten (10) business days after it acquires actual knowledge of the event constituting an event of Force Majeure, which written notice shall state in reasonable detail the nature of such event, the reason(s) that such event constitutes an event of Force Majeure, and the manner in which such event has or will delay performance of the claiming party's obligations hereunder. Each party will use reasonable efforts to mitigate the effect of any Force Majeure.

**13.13 PRIME LESSOR CONSENT**

This Sublease shall not be effective until and unless Prime Lessor has given its consent hereto; Sublessor shall be responsible for paying all costs and expenses payable to Prime Lessor under the Prime Lease in connection with obtaining such consent. Sublessor shall not be liable to Sublessee for the failure or refusal of Prime Lessor to consent to this Sublease; provided that in the event Prime Lessor has not granted its consent on or before December 15, 2020, then Sublessee shall have the right to terminate this Sublease at any time thereafter (and before such consent is received) by written notice delivered to Sublessor. Upon any such termination, each

of Sublessor and Sublessee will be released of any and all liability or obligation in connection with this Sublease.

*[Signature Page Follows]*

EXECUTED under seal, in any number of counterpart copies, each of which counterpart copies shall be an original for all purposes, as of the day and year first above written.

**SUBLESSOR**: **GENOCEA BIOSCIENCES, INC.**

By /s/ Diantha Duvall
Name: Diantha Duvall
Its: CFO
hereunto duly authorized

**SUBLESSEE**: **ZYMERGEN INC.**

By /s/ Enakshi Singh
Name: Enakshi Singh
Its: CFO
hereunto duly authorized

**Exhibit A**
**Description/Floor Plan of Premises**

FLOOR PLAN

BUILDING 100
FLOOR 6

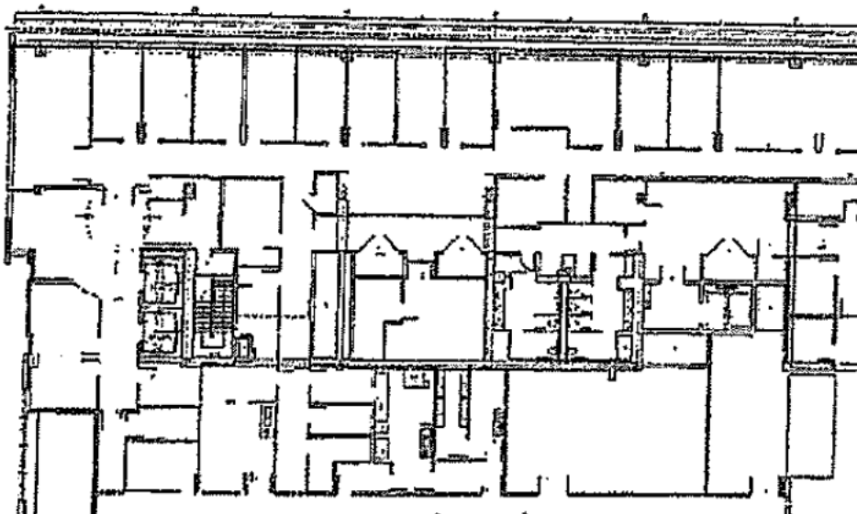


**Exhibit B**

**Prime Lease**

[See Attached]

Lease, dated as of July 3, 2012 between TBCI, LLC and Genocea Biosciences, Inc. (incorporated by reference to Exhibit 10.8 to the Company's Registration Statement on Form S-1, File No. 333-193043, dated December 23, 2013)

First Amendment to Lease, dated May 16, 2016, between 100 Discovery Park DE, LLC, a Delaware limited liability company (as successor in interest to TBCI, LLC, as Trustee of 100 Discovery Park Realty Trust) and Genocea Biosciences, Inc. (incorporated by reference to Exhibit 10.30 to the Company's Form 10-Q, File No. 001-36289, filed on August 5, 2016)

Second Amendment to the Lease, dated May 1, 2019, between 100 Discovery Park DE, LLC, a Delaware limited liability company (as successor in interest to TBCI, LLC, as Trustee of 100 Discovery Park Realty Trust) and Genocea Biosciences, Inc. (incorporated by reference to Exhibit 10.23 to the Company's Annual Report on Form 10-K, File No. 001-36289, filed on February 13, 2020)

# Exhibit C

## Schedule of Furniture and Equipment

| 100 Acorn Park Drive - Assets and Furnishings to Remain | | |
|---|---|---|
| **Item #** | **Short Description** | **Notes** |
| **Furniture Available** | | |
| 1 | Desks (24" x 48") | 24" by 48" "guest" desks - good shape |
| 2 | L-Shaped Office Desks | L Shaped larger desk in exterior offices- good shape |
| 3 | Office Chairs | All desks come with task chairs - good shape - comfort unkown |
| 4 | Soft Seating sets | Casual soft seating sets available |
| 5 | Office Whiteboards | Every office has a white board. Both interior and exterior |
| 6 | *Kitchen Fridge and other appliances?* | Keep the two black fridges |
| 7 | Conference Room 1 Furniture | large tables, chairs, whiteboards, and larger flatscreens. |
| 8 | Conference Room 2 Furniture | large tables, chairs, whiteboards, and larger flatscreens. |
| 9 | Conference Room 3 Furniture | large tables, chairs, whiteboards, and larger flatscreens. |
| 10 | Conference Room 4 Furniture | large tables, chairs, whiteboards, and projector |
| 11 | Breakroom/Kitchen Tables and Chairs | 3 circular tables, chairs, metal rack shelf, and barstools |
| 12 | Tall Storage Cabinet | Office Cabinet |
| 13 | Office Plants | Office Plants throughout |
| 14 | Lab Tables with Shelves | Picture |
| 15 | Lab Tables | Picture |
| * | **Exclusions** | office file cabinets<br>All other stored furniture |
| **Equipment Available** | | |
| 1 | Autoclave (Getinge Castle 122LS) | Getinge/ Castle Model 122LS |
| 2 | Glass washer (Getinge 8666/8668) | Getinge 8666/8668 |

**Exhibit D**
**Letter of Credit**

**L/C DRAFT LANGUAGE**

IRREVOCABLE STANDBY LETTER OF CREDIT NUMBER _____

ISSUE DATE: _____

ISSUING BANK:
SILICON VALLEY BANK
3003 TASMAN DRIVE
2ND FLOOR, MAIL SORT HF210
SANTA CLARA, CALIFORNIA 95054

BENEFICIARY:
GENOCEA BIOSCIENCES, INC.
100 ACORN PARK DRIVE, 5TH FLOOR
CAMBRIDGE, MA 02140
ATTN: DIRECTOR, OPERATIONS

APPLICANT:
ZYMERGEN, INC.
5980 HORTON STREET, SUITE 105
EMERYVILLE, CA 94602

AMOUNT: US$237,511 (TWO HUNDRED THIRTY-SEVEN THOUSAND, FIVE HUNDRED ELEVEN AND XX/100 U.S. DOLLARS)

EXPIRATION DATE: SVB WILL PUT A SPECIFIC DATE HERE THAT'S 1 YEAR ISSUANCE HERE

PLACE OF EXPIRATION: ISSUING BANK'S COUNTERS AT ITS ABOVE ADDRESS

DEAR SIR/MADAM:

WE HEREBY ESTABLISH OUR IRREVOCABLE STANDBY LETTER OF CREDIT NO. SVBSF_____ IN YOUR FAVOR AVAILABLE BY PAYMENT AGAINST YOUR PRESENTATION TO US OF THE FOLLOWING DOCUMENT:

1.BENEFICIARY'S SIGNED AND DATED STATEMENT STATING AS FOLLOWS:

"AN EVENT OF DEFAULT (AS DEFINED IN THE LEASE) HAS OCCURRED UNDER THAT CERTAIN LEASE AGREEMENT BETWEEN ZYMERGEN, INC., AS SUBLESSEE, AND GENOCEA BIOSCIENCES, INC. AS SUBLESSOR, AS AMENDED, SUPPLEMENTED OR OTHERWISE MODIFIED TO DATE. THE UNDERSIGNED HEREBY CERTIFIES THAT: (I) THE UNDERSIGNED IS AN AUTHORIZED REPRESENTATIVE OF SUBLESSOR; (II) SUBLESSOR IS THE BENEFICIARY OF LETTER OF CREDIT

NO. SVBSF _____ ISSUED BY SILICON VALLEY BANK; (III) SUBLESSOR HAS GIVEN WRITTEN NOTICE TO SUBLESSEE TO CURE THE DEFAULT PURSUANT TO THE TERMS OF THE LEASE; (IV) SUCH DEFAULT HAS NOT BEEN CURED UP TO THIS DATE OF DRAWING UNDER THE LETTER OF CREDIT; (V) SUBLESSOR IS AUTHORIZED TO DRAW DOWN ON THE LETTER OF CREDIT; AND (VI) SUBLESSOR WILL HOLD THE FUNDS DRAWN UNDER THE LETTER OF CREDIT AS SECURITY DEPOSIT FOR SUBLESSEE OR APPLY SAID FUNDS TO SUBLESSEE'S OBLIGATION UNDER THE LEASE. THE AMOUNT HEREBY DRAWN UNDER THE LETTER OF CREDIT IS US$237,511, WITH PAYMENT TO BE MADE TO THE FOLLOWING ACCOUNT: [INSERT WIRE INSTRUCTIONS (TO INCLUDE NAME AND ACCOUNT NUMBER OF THE BENEFICIARY)]."

PARTIAL DRAWS AND MULTIPLE PRESENTATIONS ARE ALLOWED.

THIS LETTER OF CREDIT SHALL BE AUTOMATICALLY EXTENDED FOR ADDITIONAL PERIODS OF ONE YEAR, WITHOUT AMENDMENT, FROM THE PRESENT OR EACH FUTURE EXPIRATION DATE UNLESS AT LEAST 30 (THIRTY) DAYS PRIOR TO THE THEN CURRENT EXPIRATION DATE WE SEND TO YOU A NOTICE BY REGISTERED OR CERTIFIED MAIL OR OVERNIGHT COURIER SERVICE AT THE ABOVE ADDRESS THAT THIS LETTER OF CREDIT WILL NOT BE EXTENDED BEYOND THE THEN CURRENT EXPIRATION DATE. IN NO EVENT SHALL THIS LETTER OF CREDIT BE AUTOMATICALLY EXTENDED BEYOND AUGUST 31, 2022. IN THE EVENT WE SEND SUCH NOTICE OF NON-EXTENSION, YOU MAY DRAW HEREUNDER BY YOUR PRESENTATION TO US OF YOUR SIGNED AND DATED STATEMENT STATING THAT YOU HAVE RECEIVED A NON-EXTENSION NOTICE FROM SILICON VALLEY BANK IN RESPECT OF LETTER OF CREDIT NO. SVBSF _____, YOU ARE DRAWING ON SUCH LETTER OF CREDIT FOR US$237,511, AND YOU HAVE NOT RECEIVED A REPLACEMENT LETTER OF CREDIT ACCEPTABLE TO YOU.

ALL DEMANDS FOR PAYMENT SHALL BE MADE BY PRESENTATION OF THE REQUIRED DOCUMENTS ON A BUSINESS DAY AT OUR OFFICE (THE "BANK'S OFFICE") AT: SILICON VALLEY BANK, 3003 TASMAN DRIVE, MAIL SORT HF 210, SANTA CLARA, CA 95054, ATTENTION: GLOBAL TRADE FINANCE. AS USED IN THIS LETTER OF CREDIT, "BUSINESS DAY" SHALL MEAN ANY DAY OTHER THAN A SATURDAY, SUNDAY OR A DAY ON WHICH BANKING INSTITUTIONS IN THE STATE OF CALIFORNIA ARE AUTHORIZED OR REQUIRED BY LAW TO CLOSE.

facsimile presentations are ALSO permitted. each facsimile transmission shall be MADE AT: (408) 496-2418 OR (408) 969-6510; AND UNDER CONTEMPORANEOUS TELEPHONE ADVICE TO: (408) 450-5001 OR (408) 654-7176, ATTENTION: GLOBAL TRADE FINANCE. ABSENCE OF THE AFORESAID TELEPHONE ADVICE SHALL NOT AFFECT OUR OBLIGATION TO HONOR ANY DRAW REQUEST.

THIS LETTER OF CREDIT IS TRANSFERABLE IN WHOLE BUT NOT IN PART ONE OR MORE TIMES, BUT IN EACH INSTANCE ONLY TO A SINGLE BENEFICIARY AS TRANSFEREE AND for THE THEN AVAILABLE AMOUNT, ASSUMING SUCH TRANSFER TO SUCH TRANSFEREE WOULD BE IN COMPLIANCE WITH THEN APPLICABLE LAW AND REGULATION, INCLUDING BUT NOT LIMITED TO THE REGULATIONS OF THE U.S. DEPARTMENT OF TREASURY AND U.S. DEPARTMENT OF COMMERCE. AT THE TIME OF TRANSFER, THE ORIGINAL LETTER OF CREDIT AND ORIGINALS OR COPIES OF ALL AMENDMENTS, IF ANY, TO THIS LETTER OF CREDIT MUST BE SURRENDERED TO US AT OUR ADDRESS INDICATED IN THIS LETTER OF CREDIT TOGETHER WITH OUR TRANSFER FORM ATTACHED HERETO AS EXHIBIT A DULY EXECUTED. APPLICANT SHALL PAY OUR TRANSFER FEE OF ¼ OF 1% OF THE TRANSFER AMOUNT (MINIMUM US$250.00) UNDER THIS LETTER OF CREDIT. EACH TRANSFER SHALL BE EVIDENCED BY EITHER (1) OUR ENDORSEMENT ON THE REVERSE OF THE LETTER OF CREDIT AND WE SHALL FORWARD THE ORIGINAL OF THE LETTER OF CREDIT SO ENDORSED TO THE TRANSFEREE OR (2) OUR ISSUING A REPLACEMENT LETTER OF CREDIT TO THE TRANSFEREE ON SUBSTANTIALLY THE SAME TERMS AND CONDITIONS AS THE TRANSFERRED LETTER OF CREDIT (IN WHICH EVENT THE TRANSFERRED LETTER OF CREDIT SHALL HAVE NO FURTHER EFFECT).

IF ANY INSTRUCTIONS ACCOMPANYING A DRAWING UNDER THIS LETTER OF CREDIT REQUEST THAT PAYMENT IS TO BE MADE BY TRANSFER TO YOUR ACCOUNT WITH ANOTHER BANK, WE WILL ONLY EFFECT SUCH PAYMENT BY FED WIRE TO A U.S. REGULATED BANK, AND WE AND/OR SUCH OTHER BANK MAY RELY ON AN ACCOUNT NUMBER SPECIFIED IN SUCH INSTRUCTIONS EVEN IF THE NUMBER IDENTIFIES A PERSON OR ENTITY DIFFERENT FROM THE INTENDED PAYEE.

THIS LETTER OF CREDIT IS SUBJECT TO THE INTERNATIONAL STANDBY PRACTICES (ISP98), INTERNATIONAL CHAMBER OF COMMERCE, PUBLICATION NO. 590.

_____ _____

AUTHORIZED SIGNATURE AUTHORIZED SIGNATURE

IRREVOCABLE STANDBY LETTER OF CREDIT NUMBER _____

**EXHIBIT A**

**FORM OF TRANSFER FORM**

DATE: _____

TO: SILICON VALLEY BANK
3003 TASMAN DRIVE RE: IRREVOCABLE STANDBY LETTER OF CREDIT
SANTA CLARA, CA 95054 NO. _____ ISSUED BY
ATTN: GLOBAL TRADE FINANCE SILICON VALLEY BANK, SANTA CLARA
STANDBY LETTERS OF CREDIT L/C AMOUNT: _____

GENTLEMEN:

FOR VALUE RECEIVED, THE UNDERSIGNED BENEFICIARY HEREBY IRREVOCABLY TRANSFERS TO:

_____
(NAME OF TRANSFEREE)

_____
(ADDRESS)

ALL RIGHTS OF THE UNDERSIGNED BENEFICIARY TO DRAW UNDER THE ABOVE LETTER OF CREDIT UP TO ITS AVAILABLE AMOUNT AS SHOWN ABOVE AS OF THE DATE OF THIS TRANSFER.

BY THIS TRANSFER, ALL RIGHTS OF THE UNDERSIGNED BENEFICIARY IN SUCH LETTER OF CREDIT ARE TRANSFERRED TO THE TRANSFEREE. TRANSFEREE SHALL HAVE THE SOLE RIGHTS AS BENEFICIARY THEREOF, INCLUDING SOLE RIGHTS RELATING TO ANY AMENDMENTS, WHETHER INCREASES OR EXTENSIONS OR OTHER AMENDMENTS, AND WHETHER NOW EXISTING OR HEREAFTER MADE. ALL AMENDMENTS ARE TO BE ADVISED DIRECTLY TO THE TRANSFEREE WITHOUT NECESSITY OF ANY CONSENT OF OR NOTICE TO THE UNDERSIGNED BENEFICIARY.

THE ORIGINAL OF SUCH LETTER OF CREDIT IS RETURNED HEREWITH, AND WE ASK YOU TO EITHER (1) ENDORSE THE TRANSFER ON THE REVERSE THEREOF, AND FORWARD IT DIRECTLY TO THE TRANSFEREE WITH YOUR CUSTOMARY NOTICE OF TRANSFER, OR (2) ISSUE A REPLACEMENT LETTER OF CREDIT TO THE TRANSFEREE ON SUBSTANTIALLY THE SAME TERMS AND CONDITIONS AS THE TRANSFERRED LETTER OF CREDIT (IN WHICH EVENT THE TRANSFERRED LETTER OF CREDIT SHALL HAVE NO FURTHER EFFECT).

SIGNATURE AUTHENTICATED

The name(s), title(s), and signature(s) conform to that/those on file with us for the company and the signature(s) is/are authorized to execute this instrument.

_____
(Name of Bank)

_____
(Address of Bank)

_____
(City, State, ZIP Code)

_____

(Authorized Name and Title)

_____
(Authorized Signature)

_____
(Telephone number)

SINCERELY,

_____
(BENEFICIARY'S NAME)

_____
(SIGNATURE OF BENEFICIARY)

_____
(NAME AND TITLE)

**EXHIBIT E**

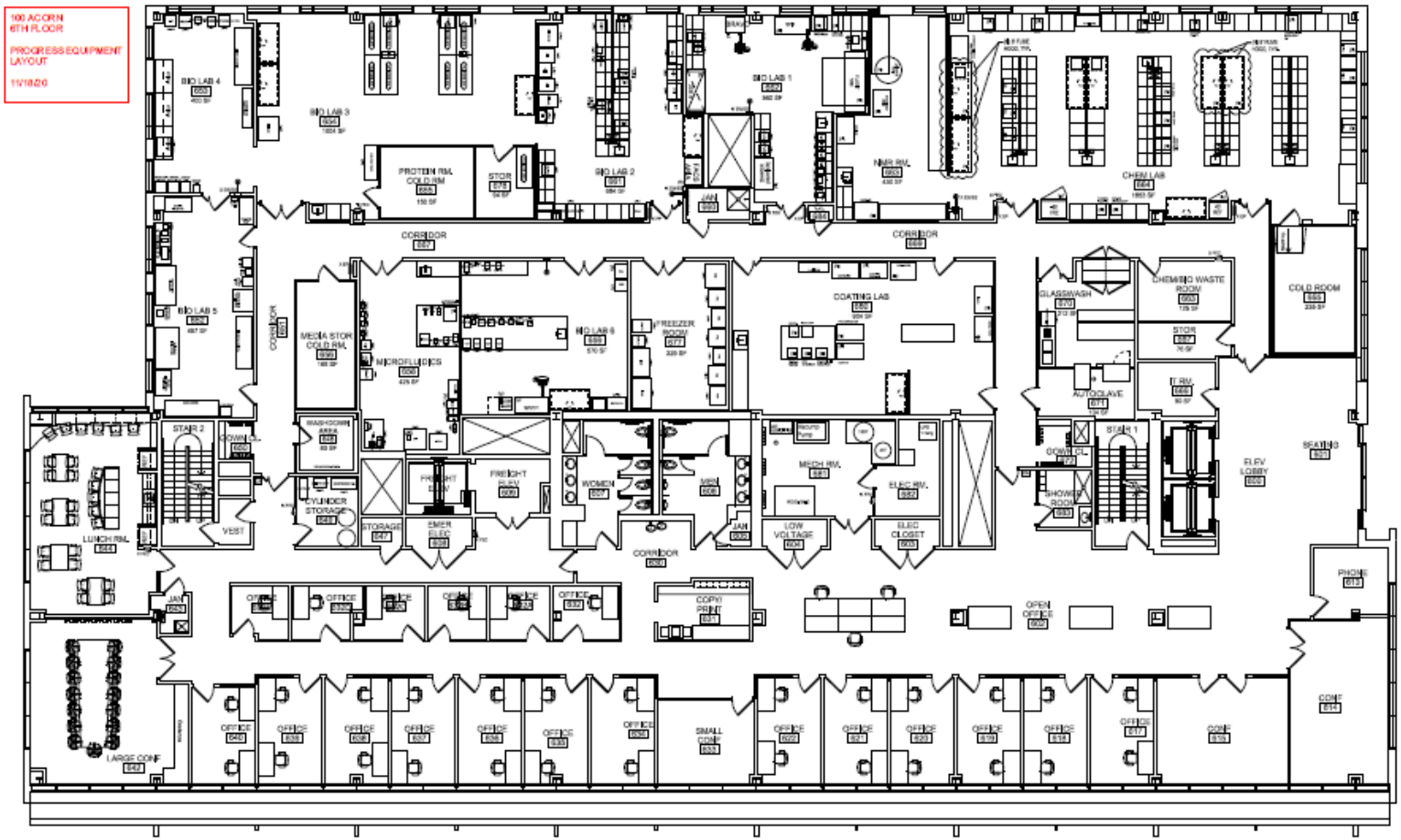
**PROPOSED ALTERATIONS**

[See Attached]

100 ACORN
6TH FLOOR

PROGRESS EQUIPMENT LAYOUT

11/18/20



**Portions of this exhibit have been redacted because they are both (i) not material and (ii) would likely cause competitive harm if publicly disclosed. Information that was omitted has been noted in this document with a placeholder identified by the mark [* * *].**

# LOAN AND SECURITY AGREEMENT

**THIS LOAN AND SECURITY AGREEMENT** (this "**Agreement**") dated as of February 18, 2021 (the "**Effective Date**") between **SILICON VALLEY BANK**, a California corporation (together with any successor or assignee "**Bank**"), and **GENOCEA BIOSCIENCES, INC.**, a Delaware corporation ("**Borrower**"), provides the terms on which Bank shall lend to Borrower and Borrower shall repay Bank. The parties agree as follows:

## 1. ACCOUNTING AND OTHER TERMS

Accounting terms not defined in this Agreement shall be construed following GAAP. Calculations and determinations must be made following GAAP. Capitalized terms not otherwise defined in this Agreement shall have the meanings set forth in Section 13. All other terms contained in this Agreement, unless otherwise indicated, shall have the meaning provided by the Code to the extent such terms are defined therein.

## 2. loan and terms of payment

**2.1 Promise to Pay**. Borrower hereby unconditionally promises to pay Bank the outstanding principal amount of all Credit Extensions and accrued and unpaid interest thereon as and when due in accordance with this Agreement.

**2.1.1 Term Loan Advance.**

(a) Availability. Subject to the terms and conditions of this Agreement, upon Borrower's request, Bank shall make one (1) term loan advance (the "**Term Loan Advance**") to Borrower, on or about the Effective Date, in an original principal amount of Ten Million Dollars ($10,000,000.00); provided that all or a portion of the Term Loan Advance shall be used to repay Borrower's outstanding liabilities and obligations to Hercules Capital (the "**Hercules Obligations**") in full. After repayment, the Term Loan Advance (or any portion thereof) may not be reborrowed.

(b) Interest Period. Commencing on the first (1st) Payment Date of the month following the month in which the Funding Date of the Term Loan Advance occurs, and continuing on each Payment Date thereafter, Borrower shall make monthly payments of interest on the principal amount of the Term Loan Advance at the rate set forth in Section 2.2(a).

(c) Repayment. Commencing on the Term Loan Amortization Date, and continuing on each Payment Date thereafter, Borrower shall repay the aggregate outstanding amount of the Term Loan Advance in (i) twenty-four (24) consecutive equal monthly installments of principal, plus (ii) monthly payments of accrued interest at the rate set forth in Section 2.2(a). All outstanding principal and accrued and unpaid interest with respect to the Term Loan Advance, and all other outstanding Obligations with respect to the Term Loan Advance, are due and payable in full on the Term Loan Maturity Date.

(d) Mandatory Prepayment Upon an Acceleration. If the Term Loan Advance is accelerated in accordance with the terms hereof following the occurrence and during the continuance of an Event of Default, Borrower shall immediately pay to Bank an amount equal to the sum of: (i) all outstanding principal thereof plus accrued and unpaid interest thereon, (ii) the Final Payment, (iii) the Prepayment Premium in effect on the date such prepayment is required to be made, plus (iv) all other sums, if any, that shall have become due and payable, including interest at the Default Rate with respect to any past due amounts.

(e) Permitted Prepayment of Term Loan Advance. Borrower shall have the option to prepay all, but not less than all, of the Term Loan Advance, provided Borrower (i) provides written notice to Bank of its election to prepay the Term Loan Advance at least ten (10) Business Days prior to such prepayment, and (ii) pays, on the date of such prepayment (A) all outstanding principal thereof plus accrued and unpaid interest thereon, (B) the Final Payment, (C) the Prepayment Premium in effect on the date of such payment, plus (D) all other sums, if any, that shall have become due and payable, including interest at the Default Rate with respect to any past due

amounts. Notwithstanding anything to the contrary contained in this Agreement, the Borrower may rescind, or extend the date for prepayment specified in, any notice of prepayment under this Section 2.1.1(e), if such prepayment would have resulted from a refinancing or other transaction which refinancing or other transaction shall not be consummated or shall otherwise be delayed.

**2.2 Payment of Interest on the Credit Extensions.**

(a) Interest Rate. Subject to Section 2.2(b), the principal amount outstanding under the Term Loan Advance shall accrue interest at a floating per annum rate equal to the greater of (i) the Prime Rate plus three percent (3.00%) and (ii) six and one-quarter of one percent (6.25%), which interest, in each case, shall be payable monthly in accordance with Section 2.2(d) below.

(b) Default Rate. Immediately upon the occurrence and during the continuance of an Event of Default, Obligations shall bear interest at a rate per annum which is four percent (4.0%) above the rate that is otherwise applicable thereto (the "**Default Rate**"). Fees and expenses which are required to be paid by Borrower pursuant to the Loan Documents (including, without limitation, Bank Expenses) but are not paid when due shall bear interest until paid at a rate equal to the highest rate applicable to the Obligations. Payment or acceptance of the increased interest rate provided in this Section 2.2(b) is not a permitted alternative to timely payment and shall not constitute a waiver of any Event of Default or otherwise prejudice or limit any rights or remedies of Bank.

(c) Adjustment to Interest Rate. Changes to the interest rate of any Credit Extension based on changes to the Prime Rate shall be effective on the effective date of any change to the Prime Rate and to the extent of any such change.

(d) Payment; Interest Computation. Interest is payable monthly on the Payment Date and shall be computed on the basis of a 360-day year for the actual number of days elapsed. In computing interest, (i) all payments received after 12:00 p.m. Eastern time on any day shall be deemed received at the opening of business on the next Business Day, and (ii) the date of the making of any Credit Extension shall be included and the date of payment shall be excluded; provided, however, that if any Credit Extension is repaid on the same day on which it is made, such day shall be included in computing interest on such Credit Extension.

**2.3 Fees**. Borrower shall pay to Bank:

(a) Final Payment. The Final Payment, when due hereunder; and

(b) Prepayment Premium. The Prepayment Premium, when (and if) due hereunder;

(c) Bank Expenses. All Bank Expenses (including reasonable and documented attorneys' fees and expenses for documentation and negotiation of this Agreement) incurred through and after the Effective Date, when due (or, if no stated due date, upon demand by Bank).

Unless otherwise provided in this Agreement or in a separate writing by Bank, Borrower shall not be entitled to any credit, rebate, or repayment of any fees earned by Bank pursuant to this Agreement notwithstanding any termination of this Agreement or the suspension or termination of Bank's obligation to make loans and advances hereunder. Bank may deduct amounts owing by Borrower under the clauses of this Section 2.3 pursuant to the terms of Section 2.4(c). Bank shall provide Borrower written notice of deductions made from the Designated Deposit Account pursuant to the terms of the clauses of this Section 2.3.

**2.4 Payments; Application of Payments; Debit of Accounts.**

(a) All payments to be made by Borrower under any Loan Document shall be made in immediately available funds in Dollars, without setoff or counterclaim, before 12:00 p.m. Eastern time on the date when due. Payments of principal and/or interest received after 12:00 p.m. Eastern time are considered received at the opening of business on the next Business Day. When a payment is due hereunder on a day that is not a Business Day, the payment shall be due the next Business Day, and additional fees or interest, as applicable, shall continue to accrue until paid.

(b) Bank has the exclusive right to determine the order and manner in which all payments with respect to the Obligations may be applied. Borrower shall have no right to specify the order or the accounts to

which Bank shall allocate or apply any payments required to be made by Borrower to Bank or otherwise received by Bank under this Agreement when any such allocation or application is not specified elsewhere in this Agreement.

(c) Bank may debit the Designated Deposit Account (or, if funds in the Designated Deposit Account are insufficient or if an Event of Default has occurred and is continuing, any other account of Borrower maintained with Bank), for principal and interest payments or any other amounts Borrower owes Bank when due hereunder. These debits shall not constitute a set-off.

**2.5 Withholding.**

(a) Payments received by Bank from Borrower under this Agreement will be made free and clear of and without deduction for any and all Taxes, unless any such withholding or deduction is required by an applicable Requirement of Law. Specifically, however, if at any time any Governmental Authority or Requirement of Law requires Borrower to make any withholding or deduction from any such payment or other sum payable hereunder to Bank, and such amount required to be withheld or deducted is an Indemnified Tax, Borrower hereby covenants and agrees that the amount due from Borrower with respect to such payment or other sum payable hereunder will be increased to the extent necessary to ensure that, after the making of such required withholding or deduction, Bank receives a net sum equal to the sum which it would have received had no withholding or deduction been required, and Borrower shall pay the full amount withheld or deducted to the relevant Governmental Authority. Borrower will, upon request, furnish Bank with proof reasonably satisfactory to Bank indicating that Borrower has made such withholding payment.

(b) If Bank is entitled to an exemption from or reduction of withholding Tax with respect to payments made under this Agreement, it shall deliver to Borrower, at the time or times reasonably requested by Borrower, such properly completed and executed documentation reasonably requested by Borrower as will permit such payments to be made without withholding or at a reduced rate of withholding or to determine the amount to deduct and withhold from such payment. In addition, Bank, if reasonably requested by Borrower, shall deliver such other documentation prescribed by applicable law or reasonably requested by Borrower as will enable Borrower to determine whether or not Bank is subject to backup withholding or information reporting requirements or as may be necessary for Borrower to comply with its obligations under FATCA or determine that Bank has complied with its obligations under FATCA or to permit Borrower to determine the withholding or deduction required to be made. Without limiting the generality of the foregoing, Bank shall deliver to Borrower on or prior to the date of the Term Loan Advance (and from time to time thereafter upon the reasonable request of Borrower) whichever of IRS Form W-9, IRS Form W-8BEN-E, IRS Form W-8ECI or W-8IMY is applicable, as well as any applicable supporting documentation or certifications.

(c) If Bank determines, in its sole discretion exercised in good faith, that it has received a refund of any Taxes as to which it has been indemnified pursuant to this Section 2.5 by Borrower, then Bank shall repay to Borrower an amount equal to such refund (but only to the extent of indemnity payments made under this Section with respect to the Taxes giving rise to such refund), net of all out-of-pocket expenses (including Taxes) of such indemnified party and without interest (other than any interest paid by the relevant Governmental Authority with respect to such refund). Borrower, upon the request of Bank, shall repay to Borrower the amount paid over pursuant to this paragraph (c) (plus any penalties, interest or other charges imposed by the relevant Governmental Authority) in the event that Bank is required to repay such refund to such Governmental Authority. Notwithstanding anything to the contrary in this Section 2.5(c), in no event will Bank be required to pay any amount to Borrower pursuant to this Section 2.5(c) the payment of which would place Bank in a less favorable net after-Tax position than Bank would have been in if the Tax subject to indemnification and giving rise to such refund had not been deducted, withheld or otherwise imposed and the indemnification payments or additional amounts with respect to such Tax had never been paid. This Section 2.5(c) shall not be construed to require Bank to make available its Tax returns (or any other information relating to its Taxes that it deems confidential) to Borrower or any other Person.

(d) The agreements and obligations of Borrower and Bank contained in this Section 2.5 shall survive the termination of this Agreement.

**3. CONDITIONS OF LOANS**

**3.1 Conditions Precedent to Initial Credit Extension**. Bank's obligation to make the initial Credit Extension is subject to the condition precedent that Bank shall have received, in form and substance satisfactory to

Bank, such documents, and completion of such other matters, as Bank may reasonably deem necessary or appropriate, including, without limitation:

(a) duly executed signatures to the Loan Documents;

(b) duly executed signatures to the Warrant;

(c) the Operating Documents and long-form good standing certificates of Borrower certified by the Secretary of State of Delaware and each other jurisdiction in which Borrower is qualified to conduct business, each as of a date no earlier than thirty (30) days prior to the Effective Date;

(d) a secretary's corporate borrowing certificate of Borrower with respect to Borrower's Operating Documents, incumbency, and resolutions authorizing the execution and delivery of this Agreement and the other Loan Documents;

(e) duly executed signatures to the completed Borrowing Resolutions for Borrower;

(f) certified copies, dated as of a recent date, of Uniform Commercial Code financing statement searches, as Bank may request, accompanied by written evidence (including any Uniform Commercial Code termination statements) that the Liens indicated in any such financing statements either constitute Permitted Liens or have been or, in connection with the initial Credit Extension, will be terminated or released;

(g) duly executed signature to a payoff letter from Hercules Capital;

(h) evidence that (i) the Liens securing Indebtedness owed by Borrower to Hercules Capital will be terminated and (ii) the documents and/or filings evidencing the perfection of such Liens, including without limitation any Uniform Commercial Code financing statements and/or any control agreements, have or will, concurrently with the initial Credit Extension, be terminated or released;

(i) duly executed signatures to the Stock Pledge Agreement;

(j) the Perfection Certificate of Borrower, together with the duly executed signature thereto;

(k) a legal opinion (with respect to authority and enforceability) of Borrower's counsel dated as of the Effective Date together with the duly executed signature thereto;

(l) evidence satisfactory to Bank that the insurance policies required by Section 6.5 hereof are in full force and effect; and

(m) payment of the fees and Bank Expenses then due as specified in Section 2.3 hereof.

**3.2 Conditions Precedent to all Credit Extensions**. Bank's obligation to make each Credit Extension, including the initial Credit Extension, is subject to the following conditions precedent:

(a) except as otherwise provided in Section 3.4, timely receipt of an executed Payment/Advance Form;

(b) the representations and warranties in this Agreement shall be true, accurate, and complete in all material respects on the date of the Payment/Advance Form and on the Funding Date of each Credit Extension; provided, that such materiality qualifier shall not be applicable to any representations and warranties that already are qualified or modified by materiality in the text thereof; and provided, further that those representations and warranties expressly referring to a specific date shall be true, accurate and complete in all material respects as of such date, and no Event of Default shall have occurred and be continuing or result from the Credit Extension. Each Credit Extension is Borrower's representation and warranty on that date that the representations and warranties in this Agreement remain true, accurate, and complete in all material respects; provided, however, that such materiality qualifier shall not be applicable to any representations and warranties that already are qualified or modified by materiality in the text thereof; and provided, further that those representations and warranties expressly referring to a specific date shall be true, accurate and complete in all material respects as of such date; and

(c) Bank determines to its reasonable satisfaction that there has not been any material impairment in the general affairs, management, results of operation, financial condition or the prospect of repayment

of the Obligations, or any material adverse deviation by Borrower from the most recent business plan of Borrower presented to and accepted by Bank.

**3.3 Covenant to Deliver**. 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 (unless otherwise agreed to by Bank in writing in its sole and absolute discretion) 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.

**3.4 Procedures for Borrowing**. Subject to the prior satisfaction of all other applicable conditions to the making of a Credit Extension set forth in this Agreement, to obtain a Credit Extension, Borrower shall notify Bank (which notice shall be irrevocable) by electronic mail, facsimile, or telephone by 12:00 p.m. Eastern time at least two (2) Business Days prior to the proposed Funding Date of such Credit Extension. Together with any such electronic or facsimile notification, Borrower shall deliver to Bank by electronic mail or facsimile a completed Payment/Advance Form executed by an Authorized Signer. Bank may rely on any telephone notice given by a person whom Bank reasonably believes is an Authorized Signer. Bank shall credit the Credit Extensions to the Designated Deposit Account. Bank may make Credit Extensions under this Agreement based on instructions from an Authorized Signer or without instructions if the Credit Extensions are necessary to meet Obligations which have become due.

## 4. CREATION OF SECURITY INTEREST

**4.1 Grant of Security Interest.** Borrower hereby grants Bank, to secure the payment and performance in full of all of the Obligations, a continuing security interest in, and pledges to Bank, to secure the payment and performance in full of all of the Obligations, the Collateral, wherever located, whether now owned or hereafter acquired or arising, and all proceeds and products thereof.

Borrower acknowledges that it previously has entered, and/or may in the future enter, into Bank Services Agreements with Bank. Regardless of the terms of any Bank Services Agreement, Borrower agrees that any amounts Borrower owes Bank thereunder shall be deemed to be Obligations hereunder and that it is the intent of Borrower and Bank to have all such Obligations secured by the first priority perfected security interest in the Collateral granted herein (subject only to Permitted Liens that are permitted pursuant to the terms of this Agreement to have superior priority to Bank's Lien in this Agreement).

If this Agreement is terminated, Bank's Lien in the Collateral shall continue until the Obligations (other than inchoate indemnity obligations, any obligations which, by their terms, are to survive the termination of this Agreement, and any Obligations under Bank Services Agreements that are cash collateralized in accordance with this Section 4.1) are repaid in full in cash. Upon payment in full in cash of the Obligations (other than inchoate indemnity obligations, any obligations which, by their terms, are to survive the termination of this Agreement, and any Obligations under Bank Services Agreements that are cash collateralized in accordance with this Section 4.1) and at such time as Bank's obligation to make Credit Extensions has terminated, Bank shall, at the sole cost and expense of Borrower, release its Liens in the Collateral and all rights therein shall revert to Borrower. In the event (x) all Obligations (other than inchoate indemnity obligations, any obligations which, by their terms, are to survive the termination of this Agreement, and any Obligations under Bank Services Agreements that are cash collateralized in accordance with this Section 4.1), except for Bank Services, are satisfied in full, and (y) this Agreement is terminated, Bank shall terminate the security interest granted herein upon Borrower providing cash collateral acceptable to Bank in its good faith business judgment for Bank Services, if any. In the event such Bank Services consist of outstanding Letters of Credit, Borrower shall provide to Bank cash collateral in an amount equal to (x) if such Letters of Credit are denominated in Dollars, then at least one hundred five percent (105.0%); and (y) if such Letters of Credit are denominated in a Foreign Currency, then at least one hundred ten percent (110.0%), of the Dollar Equivalent of the face amount of all such Letters of Credit plus, in each case, all interest, fees, and costs due or to become due in connection therewith (as estimated by Bank in its business judgment), to secure all of the Obligations relating to such Letters of Credit.

**4.2 Priority of Security Interest**. Borrower represents, warrants, and covenants that the security interest granted herein is and shall at all times continue to be a first priority perfected security interest in the Collateral (subject only to Permitted Liens that are permitted pursuant to the terms of this Agreement to have

superior priority to Bank's Lien under this Agreement). If Borrower shall acquire a commercial tort claim with a value in excess of Two Hundred Fifty Thousand Dollars ($250,000.00), 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.

**4.3 Authorization to File Financing Statements**. Borrower hereby authorizes Bank to file financing statements, without notice to Borrower, with all appropriate jurisdictions to perfect or protect Bank's interest or rights hereunder, including a notice that any disposition of the Collateral, by either Borrower or any other Person, shall be deemed to violate the rights of Bank under the Code. Such financing statements may indicate the Collateral as "all assets of the Debtor" or words of similar effect, or as being of an equal or lesser scope, or with greater detail, all in Bank's discretion.

## 5. REPRESENTATIONS AND WARRANTIES

Borrower represents and warrants as follows:

**5.1 Due Organization, Authorization; Power and Authority**. Borrower is duly existing and in good standing as a Registered Organization in its jurisdiction of formation and is qualified and licensed to do business and is in good standing in any jurisdiction in which the conduct of its business or its ownership of property requires that it be qualified except where the failure to do so could not reasonably be expected to have a material adverse effect on Borrower's business. In connection with this Agreement, Borrower has delivered to Bank a completed certificate signed by Borrower**,** entitled "Perfection Certificate" (the "**Perfection Certificate**"). Borrower represents and warrants to Bank that (a) Borrower's exact legal name is that indicated on the Perfection Certificate and, as of the Effective Date, on the signature page hereof; (b) Borrower is an organization of the type and is organized in the jurisdiction set forth in the Perfection Certificate; (c) the Perfection Certificate accurately sets forth Borrower's organizational identification number or accurately states that Borrower has none; (d) the Perfection Certificate accurately sets forth Borrower's place of business, or, if more than one, its chief executive office as well as Borrower's mailing address (if different than its chief executive office); (e) other than as set forth in the Perfection Certificate, Borrower (and each of its predecessors) has not, in the past five (5) years, changed its jurisdiction of formation, organizational structure or type, or any organizational number assigned by its jurisdiction; and (f) all other information set forth on the Perfection Certificate pertaining to Borrower and each of its Subsidiaries is accurate and complete in all material respects (it being understood and agreed that Borrower may from time to time update certain information in the Perfection Certificate after the Effective Date to the extent permitted by one or more specific provisions in this Agreement and provided that the Perfection Certificate shall be deemed to be updated to reflect the information provided in any notice that is required or permitted to be delivered (and is actually delivered) by Borrower to Bank). If Borrower is not now a Registered Organization but later becomes one, Borrower shall promptly notify Bank of such occurrence and provide Bank with Borrower's organizational identification number.

The execution, delivery and performance by Borrower of the Loan Documents to which it is a party have been duly authorized, and do not (i) conflict with any of Borrower's organizational documents, (ii) contravene, conflict with, constitute a default under or violate any material Requirement of Law, (iii) contravene, conflict or violate any applicable material order, writ, judgment, injunction, decree, determination or award of any Governmental Authority by which Borrower or any of its Subsidiaries or any of their property or assets may be bound or affected, (iv) require any action by, filing, registration, or qualification with, or Governmental Approval from, any Governmental Authority (except such Governmental Approvals which have already been obtained and are in full force and effect (or are being obtained pursuant to Section 6.1(b)) and filings with respect to the security interests created by the Loan Documents) or (v) conflict with, contravene, constitute a default or breach under, or result in or permit the termination or acceleration of, any material agreement by which Borrower is bound. Borrower is not in default under any agreement to which it is a party or by which it is bound in which the default could reasonably be expected to have a material adverse effect on Borrower's business.

**5.2 Collateral**. Borrower has good title to, rights in, and the power to transfer each item of the Collateral upon which it purports to grant a Lien hereunder, free and clear of any and all Liens except Permitted Liens. Borrower has no Collateral Accounts at or with any bank or financial institution other than Bank or Bank's Affiliates except for the Collateral Accounts described in the Perfection Certificate delivered to Bank in connection

herewith and which Borrower has taken such actions as are necessary to give Bank a perfected security interest therein, pursuant to the terms of Section 6.6(b). The Accounts are bona fide, existing obligations of the Account Debtors.

The Collateral is not in the possession of any third party bailee (such as a warehouse) except as otherwise provided in the Perfection Certificate or as permitted pursuant to Section 7.2. None of the components of the Collateral shall be maintained at locations other than as provided in the Perfection Certificate or as permitted pursuant to Section 7.2.

All Inventory is in all material respects of good and marketable quality, free from material defects (ordinary wear and tear excepted).

Borrower is the sole owner of the Intellectual Property material to Borrower's business which it owns or purports to own except for (a) non-exclusive licenses granted to its customers in the ordinary course of business, (b) over-the-counter software that is commercially available to the public, and (c) material Intellectual Property licensed to Borrower and noted on the Perfection Certificate. Each Patent which it owns or purports to own and which is material to Borrower's business is valid and enforceable, and no part of the Intellectual Property which Borrower owns or purports to own and which is material to Borrower's business has been judged invalid or unenforceable, in whole or in part. To the best of Borrower's knowledge, no claim has been made that any part of the Intellectual Property violates the rights of any third party except to the extent such claim would not reasonably be expected to have a material adverse effect on Borrower's business.

Except as noted on the Perfection Certificate or as disclosed by Borrower to Bank in writing pursuant to Section 6.7(b), Borrower is not a party to, nor is it bound by, any Restricted License.

**5.3 Litigation**. There are no actions or proceedings pending or, to the knowledge of any Responsible Officer, threatened in writing by or against Borrower or any of its Subsidiaries that could reasonably be expected to involve more than, individually or in the aggregate, Two Hundred Fifty Thousand Dollars ($250,000.00).

**5.4 Financial Statements; Financial Condition**. All consolidated financial statements for Borrower and any of its Subsidiaries delivered to Bank by submission to the Financial Statement Repository fairly present in all material respects Borrower's consolidated financial condition and Borrower's consolidated results of operations, subject only to normal year-end audit adjustments and the absence of footnotes. There has not been any material deterioration in Borrower's consolidated financial condition since the date of the most recent financial statements submitted to the Financial Statement Repository.

**5.5 Solvency**. The fair salable value of Borrower's consolidated assets (including goodwill minus disposition costs) exceeds the fair value of Borrower's consolidated liabilities; Borrower is not left with unreasonably small capital after giving effect to the transactions in this Agreement; and Borrower is able to pay its debts (including trade debts) as they mature.

**5.6 Regulatory Compliance**. Borrower is not an "investment company" or a company "controlled" by an "investment company" under the Investment Company Act of 1940, as amended. Borrower is not engaged as one of its important activities in extending credit for margin stock (under Regulations X, T and U of the Federal Reserve Board of Governors). Borrower (a) has complied in all material respects with all Requirements of Law, and (b) has not violated any Requirements of Law the violation of which could reasonably be expected to have a material adverse effect on its business. None of Borrower's or any of its Subsidiaries' properties or assets has been used by Borrower or any Subsidiary or, to the best of Borrower's knowledge, by previous Persons, in disposing, producing, storing, treating, or transporting any hazardous substance other than legally. Borrower and each of its Subsidiaries 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 to continue their respective businesses as currently conducted.

**5.7 Subsidiaries; Investments**. Borrower does not own any stock, partnership, or other ownership interest or other equity securities except for Permitted Investments.

**5.8 Tax Returns and Payments; Pension Contributions**. Borrower has timely filed all required Tax returns and reports (or duly filed valid extensions thereof), and Borrower has timely paid all foreign, federal, state and local Taxes, assessments, deposits and contributions owed by Borrower except (a) to the extent such Taxes are

being contested in good faith by appropriate proceedings promptly instituted and diligently conducted, so long as such reserve or other appropriate provision, if any, as shall be required in conformity with GAAP shall have been made therefor, or (b) if such Taxes, assessments, deposits and contributions do not, individually or in the aggregate, exceed Fifty Thousand Dollars ($50,000.00).

To the extent Borrower defers payment of any contested Taxes, Borrower shall (i) notify Bank in writing of the commencement of, and any material development in, the proceedings, and (ii) post bonds or take any other steps required to prevent the Governmental Authority levying such contested Taxes from obtaining a Lien upon any of the Collateral that is other than a Permitted Lien. Borrower is unaware of any claims or adjustments proposed for any of Borrower's prior tax years which could result in additional Taxes becoming due and payable by Borrower in excess of Fifty Thousand Dollars ($50,000.00). Borrower has paid all amounts necessary to fund all present pension, profit sharing and deferred compensation plans in accordance with their terms, and Borrower has not withdrawn from participation in, and has not permitted partial or complete termination of, or permitted the occurrence of any other event with respect to, any such plan which could reasonably be expected to result in any liability of Borrower, including any liability to the Pension Benefit Guaranty Corporation or its successors or any other governmental agency.

**5.9 Use of Proceeds**. Borrower shall use the proceeds of the Credit Extensions as working capital, to repay the Hercules Obligations in full, and to fund its general business requirements and not for personal, family, household or agricultural purposes.

**5.10 Full Disclosure**. No written representation, warranty or other statement of Borrower in any report, certificate or written statement submitted to the Financial Statement Repository, as of the date such representation, warranty, or other statement was made, taken together with all such written reports, written certificates, or written statements submitted to the Financial Statement Repository, contains any untrue statement of a material fact or omits to state a material fact necessary to make the statements contained in the reports, certificates, or written statements, in light of the circumstances under which they are made, not misleading (it being recognized by Bank that the projections and forecasts provided by Borrower in good faith and based upon reasonable assumptions are not viewed as facts and that actual results during the period or periods covered by such projections and forecasts may differ from the projected or forecasted results).

**5.11 Definition of "Knowledge."** For purposes of the Loan Documents, whenever a representation or warranty is made to Borrower's knowledge or awareness, to the "best of" Borrower's knowledge, or with a similar qualification, knowledge or awareness means the actual knowledge, after reasonable investigation, of any Responsible Officer.

## 6. AFFIRMATIVE COVENANTS

Borrower shall do all of the following:

**6.1 Government Compliance.**

(a) (i) Maintain its and all its Subsidiaries' legal existence and good standing in their respective jurisdictions of formation and (ii) maintain qualification in each jurisdiction in which it is required to do so pursuant to the laws of such jurisdiction, except in the case of this clause (ii), where the failure to so qualify would not reasonably be expected to have a material adverse effect on Borrower's business or operations. Borrower shall comply, and have each Subsidiary comply, in all material respects, with all laws, ordinances and regulations to which it is subject.

(b) Obtain all of the Governmental Approvals necessary for the performance by Borrower of its obligations under the Loan Documents to which it is a party and the grant of a security interest to Bank in all of the Collateral. Borrower shall promptly provide copies of any such obtained Governmental Approvals to Bank.

**6.2 Financial Statements, Reports.** Provide Bank with the following by submitting to the Financial Statement Repository:

(a) Financial Statements. Within forty-five (45) days after the last day of the first three (3) fiscal quarters of each fiscal year of Borrower, a company prepared consolidated balance sheet and income statement covering Borrower's consolidated operations for such quarter, consistent with such quarterly financial statements

submitted to the SEC (the "**Quarterly Financial Statements**"); provided that within ninety (90) days after the end of each fiscal year of Borrower, Borrower shall deliver annual audited consolidated financial statements, consistent with such annual financial statements submitted to the SEC, prepared in accordance with GAAP, consistently applied, together with an unqualified opinion on the financial statements from an independent certified public accounting firm reasonably acceptable to Bank for each such fiscal year of Borrower;

(b) Monthly Compliance Statement. Within thirty (30) days after the last day of each month a completed Compliance Statement, confirming that, as of the end of such month, Borrower was in full compliance with all of the terms and conditions of this Agreement, and setting forth calculations showing compliance with the financial covenants set forth in this Agreement (if any) and such other information as Bank may reasonably request;

(c) Board-Approved Projections. At least annually, within ninety (90) days after the last day of each fiscal year of Borrower, and promptly after any updates or changes thereto, annual Board-approved operating budgets and financial projections, in a form of presentation reasonably acceptable to Bank;

(d) Other Statements. Within five (5) days of delivery, copies of all statements, reports and notices made available to Borrower's security holders or to any holders of Subordinated Debt;

(e) SEC Filings. Within five (5) days of filing, copies of all periodic and other reports, proxy statements and other materials filed by Borrower with the SEC, any Governmental Authority succeeding to any or all of the functions of the SEC or with any national securities exchange, or distributed to its shareholders, as the case may be. Documents required to be delivered pursuant to the terms hereof (to the extent any such documents are included in materials otherwise filed with the SEC) may be delivered electronically and if so delivered, shall be deemed to have been delivered on the date on which Borrower posts such documents, or provides a link thereto, on Borrower's website on the internet at Borrower's website address; provided, however, Borrower shall promptly notify Bank in writing (which may be by electronic mail) of the posting of any such documents;

(f) Legal Action Notice. A prompt report of any legal actions pending or threatened in writing against Borrower or any of its Subsidiaries that could result in damages or costs to Borrower or any of its Subsidiaries of, individually or in the aggregate, Two Hundred Fifty Thousand Dollars ($250,000.00) or more;

(g) Beneficial Ownership Information. If Borrower is no longer a public company, Borrower shall provide Bank with prompt written notice of any changes to the beneficial ownership information set out in Section 14 of the Perfection Certificate. Borrower understands and acknowledges that Bank relies on such true, accurate and up-to-date beneficial ownership information to meet Bank's regulatory obligations to obtain, verify and record information about the beneficial owners of its legal entity customers; and

(h) Other Financial Information. Other financial information reasonably requested by Bank.

Any submission by Borrower of a Compliance Statement, or any other financial statement submitted to the Financial Statement Repository pursuant to this Section 6.2 shall be deemed to be a representation by Borrower that (a) as of the date of such Compliance Statement or other financial statement, the information and calculations set forth therein are true, accurate and correct, (b) as of the end of the compliance period set forth in such submission, Borrower is in compliance with all required covenants except as noted in such Compliance Statement, or other financial statement, as applicable; (c) as of the date of such submission, no Events of Default have occurred or are continuing; (d) 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 Statement, or other financial statement, as applicable, (e) as of the date of such submission, Borrower and each of its Subsidiaries has timely filed all required tax returns and reports, and Borrower has timely paid all foreign, federal, state and local taxes, assessments, deposits, and contributions owed by Borrower except as otherwise permitted pursuant to the terms of Section 5.8; and (f) as of the date of such submission, no Liens have been levied or claims made against Borrower or any of its Subsidiaries relating to unpaid employee payroll or benefits of which Borrower has not previously provided written notification to Bank.

**6.3 Inventory; Returns**. Keep all Inventory in good and marketable condition, free from material defects. Returns and allowances between Borrower and its Account Debtors shall follow Borrower's customary practices as they exist at the Effective Date. Borrower must promptly notify Bank of all returns, recoveries, disputes and claims that involve more than Fifty Thousand Dollars ($50,000.00).

**6.4 Taxes; Pensions**. Timely file**,** and require each of its Subsidiaries to timely file, all required income and all other Tax returns and reports and timely pay, and require each of its Subsidiaries to timely pay, all income and all other foreign, federal, state and local Taxes, assessments, deposits and contributions owed by Borrower and each of its Subsidiaries, except (a) taxes with respect to amounts that do not in the aggregate exceed the amount set forth in Section 5.8 hereof, and (b) for deferred payment of any Taxes contested pursuant to the terms of Section 5.8 hereof, and shall deliver to Bank, on demand, appropriate certificates attesting to such payments, and pay all amounts necessary to fund all present pension, profit sharing and deferred compensation plans in accordance with their terms.

**6.5 Insurance.**

(a) Keep its business and the Collateral insured for risks and in amounts standard for companies in Borrower's industry and location. Insurance policies shall be maintained with financially sound and reputable insurance companies that are not Affiliates of Borrower, and in amounts that are reasonably satisfactory to Bank. All property policies shall have a lender's loss payable endorsement showing Bank as lender loss payee. All liability policies shall show, or have endorsements showing, Bank as an additional insured. Bank shall be named as lender loss payee and/or additional insured with respect to any such insurance providing coverage in respect of any Collateral.

(b) Ensure that proceeds payable under any property policy are, at Bank's option, payable to Bank on account of the Obligations. Notwithstanding the foregoing, (a) so long as no Event of Default has occurred and is continuing, Borrower shall have the option of applying the proceeds of any casualty policy toward the replacement or repair of destroyed or damaged property; provided that any such replaced or repaired property (i) shall be of equal or like value as the replaced or repaired Collateral and (ii) shall be deemed Collateral in which Bank has been granted a first priority security interest, and (b) after the occurrence and during the continuance of an Event of Default, all proceeds payable under such casualty policy shall, at the option of Bank, be payable to Bank on account of the Obligations.

(c) At Bank's request, Borrower shall deliver certified copies of insurance policies and evidence of all premium payments. Each provider of any such insurance required under this Section 6.5 shall agree, by endorsement upon the policy or policies issued by it or by independent instruments furnished to Bank, that it will give Bank thirty (30) days prior written notice before any such policy or policies shall be materially altered or canceled. If Borrower fails to obtain insurance as required under this Section 6.5 or to pay any amount or furnish any required proof of payment to third persons and Bank, Bank may make all or part of such payment or obtain such insurance policies required in this Section 6.5, and take any action under the policies Bank deems prudent.

**6.6 Operating Accounts.**

(a) Maintain all of its and all of its Subsidiaries' (excluding Securities Corporation) operating accounts and excess cash with Bank and Bank's Affiliates, provided that Borrower shall be permitted to maintain its account with Oppenheimer Holdings (the "**Oppenheimer Account**"), provided that the aggregate balance in the Oppenheimer Account shall not exceed Five Thousand Dollars ($5,000.00) at any time. In addition to the foregoing, Borrower shall at all times maintain unrestricted cash in accounts in the name of Borrower with Bank, in an amount equal to the lesser of (x) one hundred percent (100.0%) of the Borrower's consolidated cash, including any Subsidiaries' (excluding Securities Corporation's) cash, in the aggregate and (y) one hundred ten percent (110.0%) of the then then-outstanding Obligations of Borrower to Bank (such amount under clause (y), the "**Minimum Threshold**"), provided that, if at any time the amount of unrestricted cash in accounts in the name of Borrower with Bank is less than the Minimum Threshold, Borrower shall completely liquidate Securities Corporation and transfer all proceeds of such liquidation into an account in the name of Borrower with Bank. Notwithstanding the foregoing, provided that no Event of Default has occurred and is continuing, at all times in which the aggregate amount of cash in accounts in the name of Borrower with Bank exceeds Twenty Million Dollars ($20,000,000.00) (the "**Required Amount**"), Borrower shall be permitted to maintain fifty percent (50.0%) of its cash in excess of the Required Amount with other financial institutions. Bank may restrict withdrawals or transfers by or on behalf of Borrower that would violate this Section 6.6(a), regardless of whether an Event of Default exists at such time. Borrower shall also conduct all of its primary banking with Bank and Bank's Affiliates, including, without limitation, letters of credit and business credit cards.

(b) Provide Bank five (5) days prior written notice before establishing any Collateral Account at or with any bank or financial institution other than Bank or Bank's Affiliates. For each Collateral Account that Borrower at any time maintains, Borrower shall cause the applicable bank or financial institution (other than Bank) at or with which any Collateral Account is maintained to execute and deliver a Control Agreement or other appropriate instrument with respect to such Collateral Account to perfect Bank's Lien in such Collateral Account in accordance with the terms hereunder which Control Agreement may not be terminated without the prior written consent of Bank. The provisions of the previous sentence shall not apply to the Excluded Accounts.

**6.7 Protection of Intellectual Property Rights.**

(a) (i) Protect, defend and maintain the validity and enforceability of the Intellectual Property material to Borrower's business; (ii) promptly advise Bank in writing of material infringements or any other event that could reasonably be expected to materially and adversely affect the value of the Intellectual Property material to Borrower's business; and (iii) not allow any Intellectual Property material to Borrower's business to be abandoned, forfeited or dedicated to the public without Bank's written consent.

(b) Provide written notice to Bank within ten (10) days of entering or becoming bound by any Restricted License (other than over-the-counter software that is commercially available to the public). Borrower shall take such commercially reasonable steps as Bank reasonably requests to obtain the consent of, or waiver by, any person whose consent or waiver is necessary for (i) any Restricted License to be deemed "Collateral" and for Bank to have a security interest in it that might otherwise be restricted or prohibited by law or by the terms of any such Restricted License, whether now existing or entered into in the future, and (ii) Bank to have the ability in the event of a liquidation of any Collateral to dispose of such Collateral in accordance with Bank's rights and remedies under this Agreement and the other Loan Documents.

**6.8 Litigation Cooperation**. From the date hereof and continuing through the termination of this Agreement, make available to Bank, without expense to Bank and upon at least one (1) Business Days' notice (provided no notice is required if an Event of Default has occurred and is continuing), Borrower and its officers, employees and agents and Borrower's books and records, to the extent that Bank may deem them reasonably necessary to prosecute or defend any third-party suit or proceeding instituted by or against Bank with respect to any Collateral or relating to Borrower.

**6.9 Access to Collateral; Books and Records**. Allow Bank, or its agents, at reasonable times, on five (5) Business Days' notice (provided no notice is required if an Event of Default has occurred and is continuing), to inspect the Collateral and audit and copy Borrower's Books. The foregoing inspections and audits shall be conducted no more often than once every twelve (12) months unless an Event of Default has occurred and is continuing in which case such inspections and audits shall occur as often as Bank shall determine is necessary. The foregoing inspections and audits shall be conducted at Borrower's expense, and the charge therefor shall be One Thousand Dollars ($1,000.00) per person per day (or such higher amount as shall represent Bank's then-current standard charge for the same), plus reasonable out-of-pocket expenses. In the event Borrower and Bank schedule an audit more than eight (8) days in advance, and Borrower cancels or seeks to reschedule the audit with less than eight (8) days written notice to Bank, then (without limiting any of Bank's rights or remedies), Borrower shall pay Bank a fee of Two Thousand Dollars ($2,000.00) plus any out-of-pocket expenses incurred by Bank to compensate Bank for the anticipated costs and expenses of the cancellation or rescheduling.

**6.10 Further Assurances**. Execute any further instruments and take further action as Bank reasonably requests to perfect or continue Bank's Lien in the Collateral or to effect the purposes of this Agreement. Deliver to Bank, within ten (10) days after the same are sent or received, copies of all material correspondence, reports, documents and other filings with any Governmental Authority regarding compliance with or maintenance of Governmental Approvals or Requirements of Law or that could reasonably be expected to have a material effect on any of the Governmental Approvals or otherwise on the operations of Borrower or any of its Subsidiaries.

**6.11 Formation or Acquisition of Subsidiaries.** Notwithstanding and without limiting the negative covenants contained in Sections 7.3 and 7.7 hereof, at the time that Borrower forms any Qualified Subsidiary or acquires any direct or indirect Qualified Subsidiary after the Effective Date (including, without limitation, pursuant to a Division), Borrower shall (a) cause such new Qualified Subsidiary to provide to Bank a joinder to this Agreement to become a co-borrower hereunder, together with such appropriate financing statements and/or Control

Agreements, all in form and substance satisfactory to Bank (including being sufficient to grant Bank a first priority Lien (subject to Permitted Liens) in and to the assets of such newly formed or acquired Qualified Subsidiary), (b) provide to Bank appropriate certificates and powers and financing statements, pledging all of the direct or beneficial ownership interest in such new Qualified Subsidiary, in form and substance satisfactory to Bank; and (c) provide to Bank all other documentation in form and substance satisfactory to Bank, including one or more opinions of counsel satisfactory to Bank, which in its opinion is appropriate with respect to the execution and delivery of the applicable documentation referred to above. Any document, agreement, or instrument executed or issued pursuant to this Section 6.11 shall be a Loan Document.

**6.12 Post-Closing Conditions**.

(a) Within thirty (30) days after the Effective Date, Borrower shall deliver to Bank (i) a stock power form (one (1) original) executed by Borrower with respect to its capital stock of Securities Corporation and the original stock certificates evidencing such ownership interest in Securities Corporation; and (ii) evidence satisfactory to Bank that the insurance endorsements required by Section 6.5 hereof are in full force and effect, together with appropriate evidence showing lender loss payable and/or additional insured clauses or endorsements in favor of Bank; and

(b) Within ten (10) Business Days after the Effective Date, Borrower shall deliver to Bank the duly executed Securities Account Control Agreement.

## 7. NEGATIVE COVENANTS

Borrower shall not do any of the following without Bank's prior written consent:

**7.1 Dispositions.** Convey, sell, lease, transfer, assign, or otherwise dispose of (including, without limitation, pursuant to a Division) (collectively, "Transfer"), or permit any of its Subsidiaries to Transfer, all or any part of its business or property, except for Transfers (a) of Inventory in the ordinary course of business; (b) of worn-out or obsolete Equipment that is, in the reasonable judgment of Borrower, no longer economically practicable to maintain or useful in the ordinary course of business of Borrower; (c) consisting of Permitted Liens and Permitted Investments; (d) of non-exclusive licenses for the use of the property of Borrower or its Subsidiaries in the ordinary course of business and licenses that could not result in a legal transfer of title of the licensed property but that may be exclusive in respects other than territory and that may be exclusive as to territory only as to discreet geographical areas outside of the United States; (e) other Transfers of non-material property with an aggregate value (for all such Transfers together) not to exceed Five Hundred Thousand Dollars ($500,000.00) in the aggregate in any twelve (12) month period; (f) consisting of the abandonment, forfeiture or dedication to the public of any Intellectual Property not material to Borrower's business, and subject to Section 6.7(a); and (g) consisting of Borrower's use or transfer of money or Cash Equivalents in a manner that is not prohibited by the terms of this Agreement or the other Loan Documents.

**7.2 Changes in Business, Management Control, or Business Locations.** (a) Engage in or permit any of its Subsidiaries to engage in any business other than the businesses currently engaged in by Borrower and such Subsidiary, as applicable, or reasonably related thereto; (b) liquidate or dissolve; (c) fail to provide notice to Bank of any Key Person departing from or ceasing to be employed by Borrower within five (5) days after such Key Person's departure from Borrower; or (d) permit or suffer any Change in Control.

Borrower shall not, without at least fifteen (15) days prior written notice to Bank: (1) add any new offices or business locations, including warehouses (unless such new offices or business locations contain less than Two Hundred Fifty Thousand Dollars ($250,000.00) in Borrower's assets or property) or deliver any portion of the Collateral valued, individually or in the aggregate, in excess of Two Hundred Fifty Thousand Dollars ($250,000.00) to a bailee at a location other than to a bailee and at a location already disclosed in the Perfection Certificate, (2) change its jurisdiction of organization, (3) change its organizational structure or type, (4) change its legal name, or (5) change any organizational number (if any) assigned by its jurisdiction of organization. If Borrower intends to add any new offices or business locations, including warehouses, containing in excess of Two Hundred Fifty Thousand Dollars ($250,000.00) of Borrower's assets or property, then Borrower will use commercially reasonable efforts to cause the landlord of any such new offices or business locations, including warehouses, to execute and deliver a landlord consent in form and substance reasonably satisfactory to Bank. If Borrower intends to deliver any

portion of the Collateral valued, individually or in the aggregate, in excess of Two Hundred Fifty Thousand Dollars ($250,000.00) to a bailee, and Bank and such bailee are not already parties to a bailee agreement governing both the Collateral and the location to which Borrower intends to deliver the Collateral, then Borrower will use commercially reasonable efforts to cause such bailee to execute and deliver a bailee agreement in form and substance reasonably satisfactory to Bank.

**7.3 Mergers or Acquisitions.** Merge or consolidate, or permit any of its Subsidiaries to merge or consolidate, with any other Person, or acquire, or permit any of its Subsidiaries to acquire, all or substantially all of the capital stock or property of another Person (including, without limitation, by the formation of any Subsidiary or pursuant to a Division). A Subsidiary may merge or consolidate into another Subsidiary or into Borrower. A Qualified Subsidiary may merge or consolidate into another Qualified Subsidiary or into Borrower.

**7.4 Indebtedness.** Create, incur, assume, or be liable for any Indebtedness, or permit any Subsidiary to do so, other than Permitted Indebtedness.

**7.5 Encumbrance.** Create, incur, allow, or suffer any Lien on any of its property, or assign or convey any right to receive income, including the sale of any Accounts, or permit any of its Subsidiaries to do so, except for Permitted Liens, permit any Collateral not to be subject to the first priority security interest granted herein (subject only to Permitted Liens that are permitted pursuant to the terms of this Agreement to have superior priority to Bank's Lien in this Agreement), or enter into any agreement, document, instrument or other arrangement (except with or in favor of Bank) with any Person which directly or indirectly prohibits or has the effect of prohibiting Borrower or any Subsidiary from assigning, mortgaging, pledging, granting a security interest in or upon, or encumbering any of Borrower's or any Subsidiary's Intellectual Property, except (a) as is otherwise permitted in Section 7.1 hereof and the definition of Permitted Liens herein, and (b) customary restrictions on assignment, transfer and encumbrances in license agreements under which Borrower or a Subsidiary is the licensee.

**7.6 Maintenance of Collateral Accounts.** Maintain any Collateral Account except pursuant to the terms of Section 6.6(b) hereof.

**7.7 Distributions; Investments.** (a) Pay any cash dividends or make any cash distribution or payment or redeem, retire or purchase any capital stock; provided that Borrower may (i) pay dividends solely in common stock; (ii) repurchase the stock of former employees, directors or consultants of Borrower pursuant to stock repurchase agreements so long as an Event of Default does not exist at the time of any such repurchase and would not exist after giving effect to any such repurchase, provided that the aggregate amount of all such repurchases does not exceed One Hundred Thousand Dollars ($100,000.00) in any twelve (12) month period, and (iii) dividends or distributions made by a Subsidiary to Borrower or a Qualified Subsidiary; or (b) directly or indirectly make any Investment (including, without limitation, by the formation of any Subsidiary) other than Permitted Investments, or permit any of its Subsidiaries to do so.

**7.8 Transactions with Affiliates.** Directly or indirectly enter into or permit to exist any material transaction with any Affiliate of Borrower, except for (a) 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, (b) transactions of the type permitted under Section 7.7(a), and (c) transactions between Borrower and Securities Corporation, subject to the terms of this Agreement.

**7.9 Subordinated Debt.** (a) Make or permit any payment on any Subordinated Debt, except under the terms of the subordination, intercreditor, or other similar agreement to which such Subordinated Debt is subject, or (b) amend any provision in any document relating to the Subordinated Debt which would increase the amount thereof, provide for earlier or greater principal, interest, or other payments thereon, or adversely affect the subordination thereof to Obligations owed to Bank.

**7.10 Compliance.** Become an "investment company" or a company controlled by an "investment company", under the Investment Company Act of 1940, as amended, or undertake as one of its important activities extending credit to purchase or carry margin stock (as defined in Regulation U of the Board of Governors of the Federal Reserve System), or use the proceeds of any Credit Extension for that purpose; fail to (a) meet the minimum funding requirements of ERISA, (b) prevent a Reportable Event or Prohibited Transaction, as defined in ERISA, from occurring, or (c) comply with the Federal Fair Labor Standards Act, the failure of any of the conditions described in clauses (a) through (c) which could reasonably be expected to have a material adverse effect on

Borrower's business; or violate any other law or regulation, if the violation could reasonably be expected to have a material adverse effect on Borrower's business, or permit any of its Subsidiaries to do so; withdraw or permit any Subsidiary to withdraw from participation in, permit partial or complete termination of, or permit the occurrence of any other event with respect to, any present pension, profit sharing and deferred compensation plan which could reasonably be expected to result in any liability of Borrower, including any liability to the Pension Benefit Guaranty Corporation or its successors or any other governmental agency.

**8. EVENTS OF DEFAULT**

Any one of the following shall constitute an event of default (an "**Event of Default**") under this Agreement:

**8.1 Payment Default**. Borrower fails to (a) make any payment of principal or interest on any Credit Extension when due, or (b) pay any other Obligations within three (3) Business Days after such Obligations are due and payable (which three (3) Business Day cure period shall not apply to payments due on the Term Loan Maturity Date). During the cure period, the failure to make or pay any payment specified under clause (b) hereunder is not an Event of Default (but no Credit Extension will be made during the cure period);

**8.2 Covenant Default.**

(a) Borrower fails or neglects to perform any obligation in Sections 6.4, 6.5, 6.6, 6.7(b), 6.9, 6.11, or 6.12 or violates any covenant in Section 7;

(b) Borrower fails or neglects to perform any obligation in Section 6.2 and has failed to cure the default within three (3) days after the occurrence thereof; or

(c) Borrower fails or neglects to perform, keep, or observe any other term, provision, condition, covenant or agreement contained in this Agreement or any Loan Documents, and as to any default (other than those specified in this Section 8) under such other term, provision, condition, covenant or agreement that can be cured, has failed to cure the default within ten (10) days after the occurrence thereof; provided, however, that if the default cannot by its nature be cured within the ten (10) day period or cannot after diligent attempts by Borrower be cured within such ten (10) day period, and such default is likely to be cured within a reasonable time, then Borrower shall have an additional period (which shall not in any case exceed thirty (30) days) to attempt to cure such default, and within such reasonable time period the failure to cure the default shall not be deemed an Event of Default (but no Credit Extensions shall be made during such cure period). Cure periods provided under this section shall not apply, among other things, to financial covenants or any other covenants set forth in clauses (a) or (b) above;

**8.3 Material Adverse Change**. A Material Adverse Change occurs;

**8.4 Attachment; Levy; Restraint on Business.**

(a) (i) The service of process seeking to attach, by trustee or similar process, any funds of Borrower or of any entity under the control of Borrower (including a Subsidiary), or (ii) a notice of lien or levy is filed against any of Borrower's assets by any Governmental Authority, and the same under subclauses (i) and (ii) hereof are not, within ten (10) days after the occurrence thereof, discharged or stayed (whether through the posting of a bond or otherwise); provided, however, no Credit Extensions shall be made during any ten (10) day cure period; or

(b) (i) any material portion of Borrower's assets is attached, seized, levied on, or comes into possession of a trustee or receiver, or (ii) any court order enjoins, restrains, or prevents Borrower from conducting all or any material part of its business;

**8.5 Insolvency**. (a) Borrower is unable to pay its debts (including trade debts) as they become due or otherwise becomes insolvent; (b) Borrower begins an Insolvency Proceeding; or (c) an Insolvency Proceeding is begun against Borrower and is not dismissed or stayed within forty-five (45) days (but no Credit Extensions shall be made while any of the conditions described in clause (a) exist and/or until any Insolvency Proceeding is dismissed);

**8.6 Other Agreements**. There is, under any agreement to which Borrower is a party with a third party or parties, (a) any default resulting in a right by such third party or parties, whether or not exercised, to accelerate the maturity of any Indebtedness in an amount individually or in the aggregate in excess of Two Hundred

Fifty Thousand Dollars ($250,000.00); or (b) any breach or default by Borrower, the result of which could reasonably be expected to have a material adverse effect on Borrower's business;

**8.7 Judgments; Penalties**. One or more fines, penalties or final judgments, orders or decrees for the payment of money in an amount, individually or in the aggregate, of at least Two Hundred Fifty Thousand Dollars ($250,000.00) (not covered by independent third-party insurance as to which liability has been accepted by such insurance carrier) shall be rendered against Borrower by any Governmental Authority, and the same are not, within ten (10) days after the entry, assessment or issuance thereof, discharged, satisfied, or paid, or after execution thereof, stayed or bonded pending appeal, or such judgments are not discharged prior to the expiration of any such stay (provided that no Credit Extensions will be made prior to the satisfaction, payment, discharge, stay, or bonding of such fine, penalty, judgment, order or decree);

**8.8 Misrepresentations**. Borrower or any Person acting for Borrower makes any representation, warranty, or other statement now or later in this Agreement, any Loan Document or in any writing delivered to Bank or to induce Bank to enter this Agreement or any Loan Document, and such representation, warranty, or other statement is incorrect in any material respect when made;

**8.9 Subordinated Debt**. The Obligations shall for any reason be subordinated or shall not have the priority contemplated by this Agreement; or

**8.10 Governmental Approvals.** Any Governmental Approval shall have been (a) revoked, rescinded, suspended, modified in an adverse manner or not renewed in the ordinary course for a full term or (b) subject to any decision by a Governmental Authority that designates a hearing with respect to any applications for renewal of any of such Governmental Approval or that could result in the Governmental Authority taking any of the actions described in clause (a) above, and such decision or such revocation, rescission, suspension, modification or non-renewal causes, or could reasonably be expected to cause, a Material Adverse Change.

## 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, without notice or demand, do any or all of the following:

(a) declare all Obligations immediately due and payable (but if an Event of Default described in Section 8.5 occurs all Obligations shall become immediately due and payable without any action by Bank);

(b) stop advancing money or extending credit for Borrower's benefit under this Agreement or under any other Loan Document;

(c) demand that Borrower (i) deposit cash with Bank in an amount equal to at least (x) one hundred five percent (105.0%) of the Dollar Equivalent of the aggregate face amount of all outstanding Letters of Credit denominated in Dollars remaining undrawn, and (y) one hundred ten percent (110.0%) of the Dollar Equivalent of the aggregate face amount of all outstanding Letters of Credit denominated in a Foreign Currency remaining undrawn (plus, in each case, all interest, fees, and costs due or to become due in connection therewith (as estimated by Bank in its good faith business judgment)), to secure all of the Obligations relating to such Letters of Credit, as collateral security for the repayment of any future drawings under such Letters of Credit, and Borrower shall forthwith deposit and pay such amounts, and (ii) pay in advance all letter of credit fees scheduled to be paid or payable over the remaining term of any Letters of Credit;

(d) terminate any FX Contracts;

(e) verify the amount of, demand payment of and performance under, and collect any Accounts and General Intangibles, settle or adjust disputes and claims directly with Account Debtors for amounts on terms and in any order that Bank considers advisable, and notify any Person owing Borrower money of Bank's security interest in such funds;

(f) make any payments and do any acts it considers necessary or reasonable to protect the Collateral and/or its security interest in the Collateral. Borrower shall assemble the Collateral if Bank requests and make it available as Bank designates. Bank may enter premises where the Collateral is located, take and maintain possession of any part of the Collateral, and pay, purchase, contest, or compromise any Lien which appears to be

prior or superior to its security interest and pay all expenses incurred. Borrower grants Bank a license to enter and occupy any of its premises, without charge, to exercise any of Bank's rights or remedies;

(g) apply to the Obligations any (i) balances and deposits of Borrower it holds, or (ii) amount held by Bank owing to or for the credit or the account of Borrower;

(h) ship, reclaim, recover, store, finish, maintain, repair, prepare for sale, advertise for sale, and sell the Collateral. Bank is hereby granted a non-exclusive, royalty-free license or other right to use, without charge, Borrower's labels, Patents, Copyrights, mask works, rights of use of any name, trade secrets, trade names, Trademarks, and advertising matter, or any similar property 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, Borrower's rights under all licenses and all franchise agreements inure to Bank's benefit;

(i) place a "hold" on any account maintained with 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;

(j) demand and receive possession of Borrower's Books; and

(k) exercise all rights and remedies available to Bank under the Loan Documents or at law or equity, including all remedies provided under the Code (including disposal of the Collateral pursuant to the terms thereof).

**9.2 Power of Attorney**. Borrower hereby irrevocably appoints Bank as its lawful attorney-in-fact, exercisable upon the occurrence and during the continuance of an Event of Default, to: (a) endorse Borrower's name on any checks or other forms of payment or security; (b) sign Borrower's name on any invoice or bill of lading for any Account or drafts against Account Debtors; (c) settle and adjust disputes and claims about the Accounts directly with Account Debtors, for amounts and on terms Bank determines reasonable; (d) make, settle, and adjust all claims under Borrower's insurance policies; (e) pay, contest or settle any Lien, charge, encumbrance, security interest, and adverse claim in or to the Collateral, or any judgment based thereon, or otherwise take any action to terminate or discharge the same; and (f) transfer the Collateral into the name of Bank or a third party as the Code permits. Borrower hereby appoints Bank as its lawful attorney-in-fact to sign Borrower's name on any documents necessary to perfect or continue the perfection of Bank's security interest in the Collateral regardless of whether an Event of Default has occurred until all Obligations (other than inchoate indemnity obligations, other obligations which by their terms survive the termination of this Agreement, and any Obligations under Bank Services Agreements that are cash collateralized in accordance with Section 4.1 of this Agreement) have been satisfied in full and Bank is under no further obligation to make Credit Extensions hereunder. Bank's foregoing appointment as Borrower's attorney in fact, and all of Bank's rights and powers, coupled with an interest, are irrevocable until all Obligations (other than inchoate indemnity obligations, other obligations which by their terms survive the termination of this Agreement, and any Obligations under Bank Services Agreements that are cash collateralized in accordance with Section 4.1 of this Agreement) have been fully repaid and performed and Bank's obligation to provide Credit Extensions terminates.

**9.3 Protective Payments**. If Borrower fails to obtain the insurance called for by Section 6.5 or fails to pay any premium thereon or fails to pay any other amount which Borrower is obligated to pay under this Agreement or any other Loan Document or which may be required to preserve the Collateral, Bank may obtain such insurance or make such payment, and all amounts so paid by Bank are Bank Expenses and immediately due and payable, bearing interest at the then highest rate applicable to the Obligations, and secured by the Collateral. Bank will make reasonable efforts to provide Borrower with notice of Bank obtaining such insurance at the time it is obtained or within a reasonable time thereafter. No payments by Bank are deemed an agreement to make similar payments in the future or Bank's waiver of any Event of Default.

**9.4 Application of Payments and Proceeds Upon Default**. If an Event of Default has occurred and is continuing, Bank shall have the right to apply in any order any funds in its possession, whether from Borrower account balances, payments, proceeds realized as the result of any collection of Accounts or other disposition of the Collateral, or otherwise, to the Obligations. Bank shall pay any surplus to Borrower by credit to the Designated Deposit Account or to other Persons legally entitled thereto; Borrower shall remain liable to Bank for any deficiency. If Bank, directly or indirectly, enters into a deferred payment or other credit transaction with any

purchaser at any sale of Collateral, Bank shall have the option, exercisable at any time, of either reducing the Obligations by the principal amount of the purchase price or deferring the reduction of the Obligations until the actual receipt by Bank of cash therefor.

**9.5 Bank's Liability for Collateral**. So long as Bank complies with reasonable banking practices regarding the safekeeping of the Collateral in the possession or under the control of Bank, Bank shall not be liable or responsible for: (a) the safekeeping of the Collateral; (b) any loss or damage to the Collateral; (c) any diminution in the value of the Collateral; or (d) any act or default of any carrier, warehouseman, bailee, or other Person. Borrower bears all risk of loss, damage or destruction of the Collateral.

**9.6 No Waiver; Remedies Cumulative**. Bank's failure, at any time or times, to require strict performance by Borrower of any provision of this Agreement or any other Loan Document shall not waive, affect, or diminish any right of Bank thereafter to demand strict performance and compliance herewith or therewith. No waiver hereunder shall be effective unless signed by the party granting the waiver and then is only effective for the specific instance and purpose for which it is given. Bank's rights and remedies under this Agreement and the other Loan Documents are cumulative. Bank has all rights and remedies provided under the Code, by law, or in equity. Bank's exercise of one right or remedy is not an election and shall not preclude Bank from exercising any other remedy under this Agreement or other remedy available at law or in equity, and Bank's waiver of any Event of Default is not a continuing waiver. Bank's delay in exercising any remedy is not a waiver, election, or acquiescence.

**9.7 Demand Waiver**. Unless otherwise expressly provided for herein or in any other Loan Document, Borrower waives demand, notice of default or dishonor, notice of payment and nonpayment, notice of any default, nonpayment at maturity, release, compromise, settlement, extension, or renewal of accounts, documents, instruments, chattel paper, and guarantees held by Bank on which Borrower is liable.

## 10. NOTICES

All notices, consents, requests, approvals, demands, or other communication by any party to this Agreement or any other Loan Document must be in writing and shall be deemed to have been validly served, given, or delivered: (a) upon the earlier of actual receipt and three (3) Business Days after deposit in the U.S. mail, first class, registered or certified mail return receipt requested, with proper postage prepaid; (b) upon transmission, when sent by electronic mail or facsimile transmission; (c) one (1) Business Day after deposit with a reputable overnight courier with all charges prepaid; or (d) when delivered, if hand-delivered by messenger, all of which shall be addressed to the party to be notified and sent to the address, facsimile number, or email address indicated below. Bank or Borrower may change its mailing or electronic mail address or facsimile number by giving the other party written notice thereof in accordance with the terms of this Section 10.

If to Borrower: Genocea Biosciences, Inc.
100 Acorn Park Drive
Cambridge, Massachusetts 02140
Attn: Chip Clark
Fax: 617.876.8192
Email: chip.clark@genocea.com

with a copy to: Ropes & Gray LLP
Prudential Tower, 800 Boylston Street
Boston, MA 02199-3600
Attn: Kevin T. Jarboe
Email: Kevin.Jarboe@ropesgray.com

If to Bank: Silicon Valley Bank
275 Grove Street, Suite 2-200
Newton, Massachusetts 02466
Attn: Lauren Cole
Email: LCole@svb.com

with a copy to: Morrison & Foerster LLP
200 Clarendon Street 20th Floor
Boston, Massachusetts 02116
Attn: David A. Ephraim, Esquire
Email: DEphraim@mofo.com

**11. CHOICE OF LAW, VENUE, AND JURY TRIAL WAIVER**

Except as otherwise expressly provided in any of the Loan Documents, Massachusetts law governs the Loan Documents without regard to principles of conflicts of law. Borrower and Bank each submit to the exclusive jurisdiction of the State and Federal courts in Boston, Massachusetts; provided, however, that nothing in this Agreement shall be deemed to operate to preclude Bank from bringing suit or taking other legal action in any other jurisdiction to realize on the Collateral or any other security for the Obligations, or to enforce a judgment or other court order in favor of Bank. Borrower expressly submits and consents in advance to such jurisdiction in any action or suit commenced in any such court, and Borrower hereby waives any objection that it may have based upon lack of personal jurisdiction, improper venue, or forum non conveniens and hereby consents to the granting of such legal or equitable relief as is deemed appropriate by such court. Borrower hereby waives personal service of the summons, complaints, and other process issued in such action or suit and agrees that service of such summons, complaints, and other process may be made by registered or certified mail addressed to Borrower at the address set forth in, or subsequently provided by Borrower in accordance with, Section 10 of this Agreement and that service so made shall be deemed completed upon the earlier to occur of Borrower's actual receipt thereof or three (3) days after deposit in the U.S. mails, proper postage prepaid.

**TO THE FULLEST EXTENT PERMITTED BY APPLICABLE LAW, BORROWER AND BANK EACH WAIVE THEIR RIGHT TO A JURY TRIAL OF ANY CLAIM OR CAUSE OF ACTION ARISING OUT OF OR BASED UPON THIS AGREEMENT, THE LOAN DOCUMENTS OR ANY CONTEMPLATED TRANSACTION, INCLUDING CONTRACT, TORT, BREACH OF DUTY AND ALL OTHER CLAIMS. THIS WAIVER IS A MATERIAL INDUCEMENT FOR BOTH PARTIES TO ENTER INTO THIS AGREEMENT. EACH PARTY HAS REVIEWED THIS WAIVER WITH ITS COUNSEL**.

This Section 11 shall survive the termination of this Agreement.

**12. GENERAL PROVISIONS**

**12.1 Termination Prior to Term Loan Maturity Date; Survival**. All covenants, representations and warranties made in this Agreement shall continue in full force until this Agreement has terminated pursuant to its terms and all Obligations (other than inchoate indemnity obligations and any other obligations which, by their terms, are to survive the termination of this Agreement and any Obligations under Bank Services Agreements that are cash collateralized in accordance with Section 4.1 of this Agreement) have been satisfied. So long as Borrower has satisfied the Obligations (other than inchoate indemnity obligations and any other obligations which, by their terms, are to survive the termination of this Agreement and any Obligations under Bank Services Agreements that are cash collateralized in accordance with Section 4.1 of this Agreement) this Agreement may be terminated prior to the Term Loan Maturity Date by Borrower, effective three (3) Business Days after written notice of termination is given to Bank; provided that such notice may be sent prior to such satisfaction of such Obligations (it being understood and agreed that in no event shall such termination become effective prior to such satisfaction); provided further that, notwithstanding anything to the contrary contained in this Agreement, the Borrower may rescind or extend the date for termination specified in any such notice if such termination would have resulted from a refinancing or other transaction which refinancing or other transaction shall not be consummated or shall otherwise be delayed. Those obligations that are expressly specified in this Agreement as surviving this Agreement's termination shall continue to survive notwithstanding this Agreement's termination.

**12.2 Successors and Assigns**. This Agreement binds and is for the benefit of the successors and permitted assigns of each party. Borrower may not assign this Agreement or any rights or obligations under it without Bank's prior written consent (which may be granted or withheld in Bank's discretion). Bank has the right, without the consent of or notice to Borrower, to sell, transfer, assign, negotiate, or grant participation in all or any

part of, or any interest in, Bank's obligations, rights, and benefits under this Agreement and the other Loan Documents (other than the Warrant, as to which assignment, transfer and other such actions are governed by the terms thereof). Notwithstanding the foregoing, so long as no Event of Default shall have occurred and is continuing, Bank shall not assign its interest in the Loan Documents to any person who is (a) a direct competitor of Borrower, or (b) a vulture fund or distressed debt fund.

**12.3 Indemnification**. Borrower agrees to indemnify, defend and hold Bank and its directors, officers, employees, agents, attorneys, or any other Person affiliated with or representing Bank (each, an "**Indemnified Person**") harmless against: (i) all obligations, demands, claims, and liabilities (collectively, "**Claims**") claimed or asserted by any other party in connection with the transactions contemplated by the Loan Documents; and (ii) all losses or expenses (including Bank Expenses) in any way suffered, incurred, or paid by such Indemnified Person as a result of, following from, consequential to, or arising from transactions contemplated by the Loan Documents (including reasonable attorneys' fees and expenses), except for Claims and/or losses or expenses directly caused by such Indemnified Person's gross negligence or willful misconduct. This Section 12.3 shall not apply with respect to Taxes, other than any Taxes that represent losses, claims, damages, etc., arising from any non-Tax claim.

This Section 12.3 shall survive until all statutes of limitation with respect to the Claims, losses, and expenses for which indemnity is given shall have run.

**12.4 Time of Essence**. Time is of the essence for the performance of all Obligations in this Agreement.

**12.5 Severability of Provisions**. Each provision of this Agreement is severable from every other provision in determining the enforceability of any provision.

**12.6 [Reserved].**

**12.7 Amendments in Writing; Waiver; Integration**. No purported amendment or modification of any Loan Document, or waiver, discharge or termination of any obligation under any Loan Document, shall be enforceable or admissible unless, and only to the extent, expressly set forth in a writing signed by the party against which enforcement or admission is sought. Without limiting the generality of the foregoing, no oral promise or statement, nor any action, inaction, delay, failure to require performance or course of conduct shall operate as, or evidence, an amendment, supplement or waiver or have any other effect on any Loan Document. Any waiver granted shall be limited to the specific circumstance expressly described in it, and shall not apply to any subsequent or other circumstance, whether similar or dissimilar, or give rise to, or evidence, any obligation or commitment to grant any further waiver. The Loan Documents represent the entire agreement about this subject matter and supersede prior negotiations or agreements. All prior agreements, understandings, representations, warranties, and negotiations between the parties about the subject matter of the Loan Documents merge into the Loan Documents.

**12.8 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, is an original, and all taken together, constitute one Agreement.

**12.9 Confidentiality**. In handling any confidential information, Bank shall exercise the same degree of care that it exercises for its own proprietary information, but disclosure of information may be made: (a) to Bank's Subsidiaries or Affiliates (such Subsidiaries and Affiliates, together with Bank, collectively, "**Bank Entities**") provided that such Subsidiaries or Affiliates shall agree to be bound by the confidentiality provisions or agreements substantially the same as those set forth in this Section 12.9; (b) to prospective transferees or purchasers of any interest in the Credit Extensions (provided, however, that any prospective transferee or purchaser shall have entered into an agreement containing provisions substantially the same as those in this Section 12.9); (c) as required by law, regulation, subpoena, or other order; (d) to Bank's regulators or as otherwise required in connection with Bank's examination or audit; (e) as Bank considers appropriate in exercising remedies under the Loan Documents; and (f) to third-party service providers of Bank in connection with the Loan Documents so long as such service providers have executed a confidentiality agreement with Bank with terms no less restrictive than those contained herein. Confidential information does not include information that is either: (i) in the public domain or in Bank's possession when disclosed to Bank, or becomes part of the public domain (other than as a result of its disclosure by Bank in violation of this Agreement) after disclosure to Bank; or (ii) disclosed to Bank by a third party, if Bank does not know that the third party is prohibited from disclosing the information.

Bank Entities may use anonymous forms of confidential information for aggregate datasets, for analyses or reporting, and for any other uses not expressly prohibited in writing by Borrower. The provisions of the immediately preceding sentence shall survive termination of this Agreement.

**12.10 Right of Set Off.** Borrower hereby grants to Bank, a lien, security interest and right of set off as security for all Obligations to Bank, whether now existing or hereafter arising upon and against all deposits, credits, collateral and property of Borrower, now or hereafter in the possession, custody, safekeeping or control of Bank or any entity under the control of Bank (including a Bank subsidiary) or in transit to any of them. At any time after the occurrence and during the continuance of an Event of Default, without demand or notice, Bank may set off the same or any part thereof and apply the same to any liability or obligation of Borrower even though unmatured and regardless of the adequacy of any other collateral securing the Obligations. ANY AND ALL RIGHTS TO REQUIRE BANK TO EXERCISE ITS RIGHTS OR REMEDIES WITH RESPECT TO ANY OTHER COLLATERAL WHICH SECURES THE OBLIGATIONS, PRIOR TO EXERCISING ITS RIGHT OF SETOFF WITH RESPECT TO SUCH DEPOSITS, CREDITS OR OTHER PROPERTY OF BORROWER ARE HEREBY KNOWINGLY, VOLUNTARILY AND IRREVOCABLY WAIVED.

**12.11 Electronic Execution of Documents**. The words "execution," "signed," "signature" and words of like import in any Loan Document shall be deemed to include electronic signatures or the keeping of records in electronic form, each of which shall be of the same legal effect, validity and enforceability as a manually executed signature or the use of a paper-based recordkeeping systems, as the case may be, to the extent and as provided for in any applicable law, including, without limitation, any state law based on the Uniform Electronic Transactions Act.

**12.12 Captions**. The headings used in this Agreement are for convenience only and shall not affect the interpretation of this Agreement.

**12.13 Construction of Agreement**. The parties mutually acknowledge that they and their attorneys have participated in the preparation and negotiation of this Agreement. In cases of uncertainty this Agreement shall be construed without regard to which of the parties caused the uncertainty to exist.

**12.14 Relationship**. The relationship of the parties to this Agreement is determined solely by the provisions of this Agreement. The parties do not intend to create any agency, partnership, joint venture, trust, fiduciary or other relationship with duties or incidents different from those of parties to an arm's-length contract.

**12.15 Third Parties**. Nothing in this Agreement, whether express or implied, is intended to: (a) confer any benefits, rights or remedies under or by reason of this Agreement on any persons other than the express parties to it and their respective permitted successors and assigns; (b) relieve or discharge the obligation or liability of any person not an express party to this Agreement; or (c) give any person not an express party to this Agreement any right of subrogation or action against any party to this Agreement.

## 13. DEFINITIONS

**13.1 Definitions**. As used in the Loan Documents, the word "shall" is mandatory, the word "may" is permissive, the word "or" is not exclusive, the words "includes" and "including" are not limiting, the singular includes the plural, and numbers denoting amounts that are set off in brackets are negative. As used in this Agreement, the following capitalized terms have the following meanings:

"**Account**" is any "account" as defined in the Code with such additions to such term as may hereafter be made, and includes, without limitation, all accounts receivable and other sums owing to Borrower.

"**Account Debtor**" is any "account debtor" as defined in the Code with such additions to such term as may hereafter be made.

"**Affiliate**" is, with respect to any Person, each other Person that owns or controls directly or indirectly the Person, any Person that controls or is controlled by or is under common control with the Person, and each of that Person's senior executive officers, directors, partners and, for any Person that is a limited liability company, that Person's managers and members.

"**Agreement**" is defined in the preamble hereof.

"**ASU**" is defined in the definition of GAAP.

"**Authorized Signer**" is any individual listed in Borrower's Borrowing Resolutions who is authorized to execute the Loan Documents, including any Credit Extension request, on behalf of Borrower.

"**Bank**" is defined in the preamble hereof.

"**Bank Entities**" is defined in Section 12.9.

"**Bank Expenses**" are all documented audit fees and expenses and documented costs and expenses (including reasonable and documented attorneys' fees and expenses) incurred in connection with preparing, amending, negotiating, administering, defending and enforcing the Loan Documents (including, without limitation, those incurred in connection with appeals or Insolvency Proceedings) or otherwise incurred with respect to Borrower.

"**Bank Services**" are any products, credit services, and/or financial accommodations previously, now, or hereafter provided to Borrower or any of its Subsidiaries by Bank or any Bank Affiliate, including, without limitation, any letters of credit, cash management services (including, without limitation, merchant services, direct deposit of payroll, business credit cards, and check cashing services), interest rate swap arrangements, and foreign exchange services as any such products or services may be identified in Bank's various agreements related thereto (each, a "**Bank Services Agreement**").

"**Bank Services Agreement**" is defined in the definition of Bank Services.

"**Board**" is Borrower's board of directors.

"**Borrower**" is defined in the preamble hereof.

"**Borrower's Books**" are all Borrower's books and records including ledgers, federal and state tax returns, records regarding Borrower's assets or liabilities, the Collateral, business operations or financial condition, and all computer programs or storage or any equipment containing such information.

"**Borrowing Resolutions**" are, with respect to any Person, those resolutions adopted by such Person's board of directors (and, if required under the terms of such Person's Operating Documents, stockholders) and delivered by such Person to Bank approving the Loan Documents to which such Person is a party and the transactions contemplated thereby, together with a certificate executed by its secretary on behalf of such Person certifying (a) such Person has the authority to execute, deliver, and perform its obligations under each of the Loan Documents to which it is a party, (b) that set forth as a part of or attached as an exhibit to such certificate is a true, correct, and complete copy of the resolutions then in full force and effect authorizing and ratifying the execution, delivery, and performance by such Person of the Loan Documents to which it is a party, (c) the name(s) of the Person(s) authorized to execute the Loan Documents, including any Credit Extension request, on behalf of such Person, together with a sample of the true signature(s) of such Person(s), and (d) that Bank may conclusively rely on such certificate unless and until such Person shall have delivered to Bank a further certificate canceling or amending such prior certificate.

"**Business Day**" is any day that is not a Saturday, Sunday or a day on which Bank is closed, except that if any determination of a "Business Day" shall relate to an FX Contract, the term "Business Day" shall mean a day on which dealings are carried on in the country of settlement of the Foreign Currency.

"**Cash Equivalents**" means (a) marketable direct obligations issued or unconditionally guaranteed by the United States or any agency or any State thereof having maturities of not more than one (1) year from the date of acquisition; (b) commercial paper maturing no more than one (1) year after its creation and having the highest rating from either Standard & Poor's Ratings Group or Moody's Investors Service, Inc.; (c) Bank's certificates of deposit issued maturing no more than one (1) year after issue; and (d) money market funds at least ninety-five percent (95.0%) of the assets of which constitute Cash Equivalents of the kinds described in clauses (a) through (c) of this definition.

"**Change in Control**" means (a) at any time, any "person" or "group" (as such terms are used in Sections 13(d) and 14(d) of the Exchange Act) shall become, or obtain rights (whether by means of warrants, options or otherwise) to become, the "beneficial owner" (as defined in Rules 13(d)-3 and 13(d)-5 under the Exchange Act), directly or indirectly, of forty percent (40.0%) or more of the ordinary voting power for the election of directors of Borrower (determined on a fully diluted basis) other than by the sale of Borrower's equity securities in a public

offering or to venture capital or private equity investors so long as Borrower identifies to Bank the venture capital or private equity investors at least seven (7) Business Days prior to the closing of the transaction and provides to Bank a description of the material terms of the transaction; (b) during any period of twelve (12) consecutive months, a majority of the members of the Board or other equivalent governing body of Borrower cease to be composed of individuals (i) who were members of that board or equivalent governing body on the first day of such period, (ii) whose election or nomination to that board or equivalent governing body was approved by individuals referred to in clause (i) above constituting at the time of such election or nomination at least a majority of that board or equivalent governing body or (iii) whose election or nomination to that board or other equivalent governing body was approved by individuals referred to in clauses (i) and (ii) above constituting at the time of such election or nomination at least a majority of that board or equivalent governing body; or (c) at any time, Borrower shall cease to own and control, of record and beneficially, directly or indirectly, one hundred percent (100.0%) of each class of outstanding capital stock of each Subsidiary of Borrower free and clear of all Liens (except Liens created by this Agreement and Permitted Liens).

"**Claims**" is defined in Section 12.3.

"**Code**" is the Uniform Commercial Code, as the same may, from time to time, be enacted and in effect in the Commonwealth of Massachusetts; provided, that, to the extent that the Code is used to define any term herein or in any Loan Document and such term is defined differently in different Articles or Divisions of the Code, the definition of such term contained in Article or Division 9 shall govern; provided further, that in the event that, by reason of mandatory provisions of law, any or all of the attachment, perfection, or priority of, or remedies with respect to, Bank's Lien on any Collateral is governed by the Uniform Commercial Code in effect in a jurisdiction other than the Commonwealth of Massachusetts the term "**Code**" shall mean the Uniform Commercial Code as enacted and in effect in such other jurisdiction solely for purposes of the provisions thereof relating to such attachment, perfection, priority, or remedies and for purposes of definitions relating to such provisions.

"**Collateral**" is any and all properties, rights and assets of Borrower described on Exhibit A.

"**Collateral Account**" is any Deposit Account, Securities Account, or Commodity Account maintained by the Borrower or any Qualified Subsidiary, in each case, other than an Excluded Account.

"**Commodity Account**" is any "commodity account" as defined in the Code with such additions to such term as may hereafter be made.

"**Compliance Statement**" is that certain statement in the form attached hereto as Exhibit B.

"**Contingent Obligation**" is, for any Person, any direct or indirect liability, contingent or not, of that Person for (a) any indebtedness, lease, dividend, letter of credit or other obligation of another such as an obligation, in each case, directly or indirectly guaranteed, endorsed, comade, discounted or sold with recourse by that Person, or for which that Person is directly or indirectly liable; (b) any obligations for undrawn letters of credit for the account of that Person; and (c) all obligations from any interest rate, currency or commodity swap agreement, interest rate cap or collar agreement, or other agreement or arrangement designated to protect a Person against fluctuation in interest rates, currency exchange rates or commodity prices; but "Contingent Obligation" does not include endorsements in the ordinary course of business. The amount of a Contingent Obligation is the stated or determined amount of the primary obligation for which the Contingent Obligation is made or, if not determinable, the maximum reasonably anticipated liability for it determined by the Person in good faith; but the amount may not exceed the maximum of the obligations under any guarantee or other support arrangement.

"**Control Agreement**" is any control agreement entered into among the depository institution at which Borrower maintains a Deposit Account or the securities intermediary or commodity intermediary at which Borrower maintains a Securities Account or a Commodity Account, Borrower, and Bank pursuant to which Bank obtains control (within the meaning of the Code) over such Deposit Account, Securities Account, or Commodity Account.

"**Copyrights**" are any and all copyright rights, copyright applications, copyright registrations and like protections in each work of authorship and derivative work thereof, whether published or unpublished and whether or not the same also constitutes a trade secret.

"**Credit Extension**" is the Term Loan Advance, or any other extension of credit by Bank for Borrower's benefit.

"**Default Rate**" is defined in Section 2.2(b).

"**Deposit Account**" is any "deposit account" as defined in the Code with such additions to such term as may hereafter be made.

"**Designated Deposit Account**" is the account number ending [* * *] (last three digits), maintained by Borrower with Bank (provided, however, if no such account number is included, then the Designated Deposit Account shall be any deposit account of Borrower (other than an Excluded Account maintained with Bank as chosen by Bank).

"**Division**" is, in reference to any Person which is an entity, the division of such Person into two (2) or more separate Persons, with the dividing Person either continuing or terminating its existence as part of such division, including, without limitation, as contemplated under Section 18-217 of the Delaware Limited Liability Company Act for limited liability companies formed under Delaware law, or any analogous action taken pursuant to any other applicable law with respect to any corporation, limited liability company, partnership or other entity.

"**Dollars**," "**dollars**" or use of the sign "**$**" is only lawful money of the United States and not any other currency, regardless of whether that currency uses the "$" sign to denote its currency or may be readily converted into lawful money of the United States.

"**Dollar Equivalent**" is, at any time, (a) with respect to any amount denominated in Dollars, such amount, and (b) with respect to any amount denominated in a Foreign Currency, the equivalent amount therefor in Dollars as determined by Bank at such time on the basis of the then-prevailing rate of exchange in San Francisco, California, for sales of the Foreign Currency for transfer to the country issuing such Foreign Currency.

"**Domestic Subsidiary**" means a Subsidiary organized under the laws of the United States or any state or territory thereof or the District of Columbia.

"**Effective Date**" is defined in the preamble hereof.

"**Equipment**" is all "equipment" as defined in the Code with such additions to such term as may hereafter be made, and includes without limitation all machinery, fixtures, goods, vehicles (including motor vehicles and trailers), and any interest in any of the foregoing.

"**ERISA**" is the Employee Retirement Income Security Act of 1974, and its regulations.

"**Event of Default**" is defined in Section 8.

"**Exchange Act**" is the Securities Exchange Act of 1934, as amended.

"**Excluded Accounts**" means (i) the Oppenheimer Account, and (ii) 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.

"**Excluded Taxes**" means any of the following taxes imposed on or with respect to Bank, or required to be withheld and deducted from a payment to Bank, (a) Taxes imposed on or measured by net income (however denominated), franchise Taxes, and branch profits Taxes, in each case, (i) imposed as a result of the Investor being organized under the laws of, or having its principal office in the jurisdiction imposing such Tax (or any political subdivision thereof) or (ii) that are Other Connection Taxes, (b) U.S. federal withholding Taxes imposed on amounts payable to or for the account of Bank with respect to this Agreement pursuant to a law in effect on the date on which (i) Bank becomes a party to this Agreement or acquires and interest in any Credit Extension or (ii) Bank changes its lending office, except in each case to the extent that, pursuant to Section 2.5, amounts with respect to such Taxes were payable either to Bank immediately before becoming a party hereto or to Bank immediately before it changed its lending office, (c) Taxes attributable to Bank's failure to comply with Section 2.5(c), and (d) any U.S. federal withholding Taxes imposed under FATCA.

"**FATCA**" means IRC Sections 1471 through 1474, as of the date of this Agreement, any current or future regulations or official interpretations thereof, any agreements entered into pursuant to IRC Section 1471(b)(1) and any fiscal or regulatory legislation, rules or practices adopted pursuant to any intergovernmental agreement, treaty or convention among Governmental Authorities and implementing such Sections of the IRC.

"**Final Payment**" is a payment (in addition to and not in substitution for the regular monthly payments of principal plus accrued interest) equal to Five Hundred Thousand Dollars ($500,000.00), due on the earliest to occur of (a) the Term Loan Maturity Date, (b) the payment in full of the Term Loan Advance, (c) as required by Section 2.1.1(d) or Section 2.1.1(e), or (d) the termination of this Agreement.

"**Financial Statement Repository**" is [* * *] or such other means of collecting information approved and designated by Bank after providing notice thereof to Borrower from time to time.

"**Foreign Currency**" is lawful money of a country other than the United States.

"**Foreign Subsidiary**" means any Subsidiary which is not a Domestic Subsidiary.

"**Funding Date**" is any date on which a Credit Extension is made to or for the account of Borrower which shall be a Business Day.

"**FX Contract**" is any foreign exchange contract by and between Borrower and Bank under which Borrower commits to purchase from or sell to Bank a specific amount of Foreign Currency on a specified date.

"**GAAP**" is generally accepted accounting principles set forth in the opinions and pronouncements of the Accounting Principles Board of the American Institute of Certified Public Accountants and statements and pronouncements of the Financial Accounting Standards Board or in such other statements by such other Person as may be approved by a significant segment of the accounting profession, which are applicable to the circumstances as of the date of determination. Additionally, notwithstanding anything to the contrary herein, any obligations of a Person that are or would have been treated as operating leases for purposes of GAAP prior to the issuance by the Financial Accounting Standards Board on February 25, 2016 of an Accounting Standards Update (the "**ASU**") shall continue to be accounted for as operating leases for purposes of all financial definitions, calculations and covenants for purpose of this Agreement (whether or not such operating lease obligations were in effect on such date) notwithstanding the fact that such obligations are required in accordance with the ASU (on a prospective or retroactive basis or otherwise) to be treated as capitalized lease obligations in accordance with GAAP.

"**General Intangibles**" is all "general intangibles" as defined in the Code in effect on the date hereof with such additions to such term as may hereafter be made, and includes without limitation, all Intellectual Property, claims, income and other tax refunds, security and other deposits, payment intangibles, contract rights, options to purchase or sell real or personal property, rights in all litigation presently or hereafter pending (whether in contract, tort or otherwise), insurance policies (including without limitation key man, property damage, and business interruption insurance), payments of insurance and rights to payment of any kind.

"**Governmental Approval**" is any consent, authorization, approval, order, license, franchise, permit, certificate, accreditation, registration, filing or notice, of, issued by, from or to, or other act by or in respect of, any Governmental Authority.

**"Governmental Authority**" is any nation or government, any state or other political subdivision thereof, any agency, authority, instrumentality, regulatory body, court, central bank or other entity exercising executive, legislative, judicial, taxing, regulatory or administrative functions of or pertaining to government, any securities exchange and any self-regulatory organization.

"**Hercules Obligations**" is defined in Section 2.1.1(a).

"**Indebtedness**" is (a) indebtedness for borrowed money or the deferred price of property or services, such as reimbursement and other obligations for surety bonds and letters of credit, (b) obligations evidenced by notes, bonds, debentures or similar instruments, (c) capital lease obligations (as determined in accordance with GAAP), and (d) Contingent Obligations.

"**Indemnified Person**" is defined in Section 12.3.

"**Indemnified Tax**" means (a) Taxes, other than Excluded Taxes, imposed on or with respect to any payment made by or on account of any obligation of Borrower pursuant to any Loan Document and (b) to the extent not otherwise described in (a), Other Taxes.

"**Insolvency Proceeding**" is any proceeding by or against any Person under the United States Bankruptcy Code, or any other bankruptcy or insolvency law, including assignments for the benefit of creditors, compositions, extensions generally with its creditors, or proceedings seeking reorganization, arrangement, or other relief.

"**Intellectual Property**" is, with respect to any Person, all of such Person's right, title, and interest in and to the following:

(a) its Copyrights, Trademarks and Patents;

(b) any and all trade secrets and trade secret rights, including, without limitation, any rights to unpatented inventions, know-how, and operating manuals;

(c) any and all source code;

(d) any and all design rights which may be available to such Person;

(e) any and all claims for damages by way of past, present and future infringement of any of the foregoing, 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; and

(f) all amendments, renewals and extensions of any of the Copyrights, Trademarks or Patents.

"**Interest Only Extension Event**" occurs if and when (if ever) Bank confirms in writing that it has received evidence, on or prior to September 30, 2021, satisfactory to Bank in its sole and absolute discretion, that Borrower has achieved one (1) of the following: (i) Performance Milestone A, (ii) Performance Milestone B, or (iii) Performance Milestone C.

"**Inventory**" is all "inventory" as defined in the Code in effect on the date hereof with such additions to such term as may hereafter be made, and includes without limitation all merchandise, raw materials, parts, supplies, packing and shipping materials, work in process and finished products, including without limitation such inventory as is temporarily out of Borrower's custody or possession or in transit and including any returned goods and any documents of title representing any of the above.

"**Investment**" is any beneficial ownership interest in any Person (including stock, partnership interest or other securities), and any loan, advance or capital contribution to any Person.

"**IRC**" means the U.S. Internal Revenue Code of 1986, as amended.

"**Key Person**" is Borrower's Chief Executive Officer, who is William D. Clark as of the Effective Date.

"**Letter of Credit**" is a standby or commercial letter of credit issued by Bank upon request of Borrower based upon an application, guarantee, indemnity, or similar agreement.

"**Lien**" is a claim, mortgage, deed of trust, levy, charge, pledge, security interest or other encumbrance of any kind, whether voluntarily incurred or arising by operation of law or otherwise against any property.

"**Loan Documents**" are, collectively, this Agreement and any schedules, exhibits, certificates, notices, and any other documents related to this Agreement, the Warrant, the Stock Pledge Agreement, the Perfection Certificate, any Control Agreements, any Bank Services Agreement, any subordination agreement, any note, or notes or guaranties executed by Borrower, and any other present or future agreement by Borrower with or for the benefit of Bank in connection with this Agreement or Bank Services, all as amended, restated, or otherwise modified.

"**Material Adverse Change**" is (a) a material impairment in the perfection or priority of Bank's Lien in the Collateral or in the value of such Collateral; (b) a material adverse change in the business, operations, or condition (financial or otherwise) of Borrower; or (c) a material impairment of the prospect of repayment of any portion of the Obligations.

"**Minimum Threshold**" is defined in Section 6.6(a).

"**Obligations**" are Borrower's obligations to pay when due any debts, principal, interest, fees, the Final Payment, the Prepayment Premium, Bank Expenses, and other amounts Borrower owes Bank now or later, whether under this Agreement, the other Loan Documents (other than the Warrant), including, without limitation, all

obligations relating to Bank Services and any interest accruing after Insolvency Proceedings begin and debts, liabilities, or obligations of Borrower assigned to Bank, and to perform Borrower's duties under the Loan Documents (other than the Warrant).

"**Operating Documents**" are, for any Person, such Person's formation documents, as certified by the Secretary of State (or equivalent agency) of such Person's jurisdiction of organization on a date that is no earlier than thirty (30) days prior to the Effective Date, and, (a) if such Person is a corporation, its bylaws in current form, (b) if such Person is a limited liability company, its limited liability company agreement (or similar agreement), and (c) if such Person is a partnership, its partnership agreement (or similar agreement), each of the foregoing with all current amendments or modifications thereto.

"**Oppenheimer Account**" is defined in Section 6.6(a).

"**Other Connection Taxes**" means Taxes imposed as a result of a present or former connection between Bank and the jurisdiction imposing such Tax (other than connections arising solely from Bank having executed, delivered, become a party to, performed its obligations under, received payments under, received or perfected a security interest under, or engaged in any other transaction pursuant to, this Agreement, or sold or assigned an interest in any Credit Extension or Loan Document).

"**Other Taxes**" means any present or future stamp, court or documentary, intangible, recording, or filing Taxes or any other excise or property taxes, charges or similar levies or Taxes that arise from any payment made hereunder or from the execution, delivery, performance, enforcement or registration of, from the receipt or perfection of a security interest under, or otherwise with respect to, any Loan Document, except any such Taxes that are Other Connection Taxes imposed with respect to an assignment.

"**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.

"**Payment/Advance Form**" is that certain form attached hereto as Exhibit C.

"**Payment Date**" is the first (1st) Business Day of each month.

"**Perfection Certificate**" is defined in Section 5.1.

"**Performance Milestone A**" occurs if and when (if ever) Bank confirms in writing, on or prior to September 30, 2021, that [* * *].

"**Performance Milestone B**" occurs if and when (if ever) Bank confirms in writing that [* * *].

"**Performance Milestone C**" occurs if and when (if ever) Bank confirms in writing on or prior to September 30, 2021, that [* * *].

"**Permitted Indebtedness**" is:

(a) Borrower's Indebtedness to Bank under this Agreement and the other Loan Documents;

(b) Indebtedness existing on the Effective Date which is shown on the Perfection Certificate;

(c) Subordinated Debt;

(d) unsecured Indebtedness to trade creditors incurred in the ordinary course of business;

(e) Indebtedness incurred as a result of endorsing negotiable instruments received in the ordinary course of business;

(f) Indebtedness secured by Liens permitted under clauses (a) and (c) of the definition of "Permitted Liens" hereunder;

(g) other unsecured Indebtedness not to exceed Two Hundred Fifty Thousand Dollars ($250,000.00) in the aggregate outstanding at any time;

(h) intercompany obligations to the extent constituting a Permitted Investment;

(i) Indebtedness incurred in connection with the financing of insurance premiums;

(j) reimbursement obligations in connection with letters of credit issued by financial institutions other than Bank in the ordinary course of Borrower's business;

(k) obligations from any interest rate, currency or commodity swap, interest rate cap, collar or similar arrangements entered into in the ordinary course of Borrower's business;

(l) surety bonds issued in the ordinary course of business; and

(m) extensions, refinancings, modifications, amendments and restatements of any items of Permitted Indebtedness (a) through (l) above, provided that the principal amount thereof is not increased or the terms thereof are not modified to impose more burdensome terms upon Borrower or its Subsidiary, as the case may be.

"**Permitted Investments**" are:

(a) Investments (including, without limitation, Subsidiaries) existing on the Effective Date which are shown on the Perfection Certificate;

(b) (i) Investments consisting of Cash Equivalents; and (ii) any Investments permitted by Borrower's investment policy attached hereto as Exhibit D, as amended from time to time, provided that such investment policy (and any such amendment thereto) has been approved in writing by Bank;

(c) Investments accepted in connection with Transfers permitted by Section 7.1;

(d) 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 business;

(e) 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, for the avoidance of doubt, this subparagraph (e) shall not apply to Investments of Borrower in any Subsidiary;

(f) Investments 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 plans or agreements approved by the Board;

(g) Investments in Qualified Subsidiaries;

(h) other Investments not otherwise permitted by Section 7.7 not exceeding Two Hundred Fifty Thousand Dollars ($250,000.00) in the aggregate outstanding at any time; and

(i) cash Investments by Borrower in Securities Corporation; provided that (i) no Event of Default has occurred and is continuing or would result from such Investment and (ii) Borrower and its Subsidiaries are, at all times, in compliance with Section 6.6(a).

"**Permitted Liens**" are:

(a) Liens existing on the Effective Date which are shown on the Perfection Certificate or arising under this Agreement and the other Loan Documents;

(b) Liens for taxes, fees, assessments or other government charges or levies, either (i) not due and payable or (ii) being contested in good faith and for which Borrower maintains adequate reserves on its Books, provided that no notice of any such Lien has been filed or recorded under the Internal Revenue Code of 1986, as amended, and the Treasury Regulations adopted thereunder;

(c) purchase money Liens or capital leases (i) on Equipment acquired or held by Borrower incurred for financing the acquisition of the Equipment securing no more than Two Hundred Fifty Thousand Dollars ($250,000.00) in the aggregate outstanding at any time, or (ii) existing on Equipment when acquired, if the Lien is confined to the property and improvements and the proceeds of the Equipment;

(d) Liens arising from attachments or judgments, orders, or decrees in circumstances not constituting an Event of Default under Sections 8.4 and 8.7;

(e) Liens to secure payment of workers' compensation, employment insurance, old-age pensions, social security and other like obligations incurred in the ordinary course of business (other than Liens imposed by ERISA);

(f) leases or subleases of real property granted in the ordinary course of Borrower's business (or, if referring to another Person, in the ordinary course of such Person's business), and leases, subleases, non-exclusive licenses or sublicenses of personal property (other than Intellectual Property) granted in the ordinary course of Borrower's business (or, if referring to another Person, in the ordinary course of such Person's business), if the leases, subleases, licenses and sublicenses do not prohibit granting Bank a security interest therein;

(g) Liens in favor of customs and revenue authorities, incurred in the ordinary course of Borrower's business, arising as a matter of law to secure payment of custom duties that are promptly paid on or before the date they become due;

(h) Liens on insurance proceeds securing the payment of financed insurance premiums that are promptly paid on or before the date they become due (provided that such Liens extend only to such insurance proceeds and not to any other property or assets);

(i) easements, zoning restrictions, rights-of-way, and other similar encumbrances on real property imposed by law or arising in the ordinary course of business that do not secure any monetary obligations and do not interfere with the ordinary course of business Borrower's business in any material respect;

(j) Liens of carriers, warehousemen, suppliers, or other Persons that are possessory in nature arising in the ordinary course of business so long as such Liens attach only to Inventory, securing liabilities in the aggregate amount not to exceed Two Hundred Fifty Thousand Dollars ($250,000.00) and which are not delinquent or remain payable without penalty or which are being contested in good faith and by appropriate proceedings which proceedings have the effect of preventing the forfeiture or sale of the property subject thereto;

(k) non-exclusive licenses of Intellectual Property granted to third parties in the ordinary course of business, and licenses of Intellectual Property that could not result in a legal transfer of title of the licensed property that may be exclusive in respects other than territory and that may be exclusive as to territory only as to discreet geographical areas outside of the United States; and

(l) Liens incurred in the extension, renewal or refinancing of the indebtedness secured by Liens described in (a) through (k), but any extension, renewal or replacement Lien must be limited to the property encumbered by the existing Lien and the principal amount of the indebtedness may not increase.

"**Person**" is any individual, sole proprietorship, partnership, limited liability company, joint venture, company, trust, unincorporated organization, association, corporation, institution, public benefit corporation, firm, joint stock company, estate, entity or government agency.

"**Prepayment Premium**" shall be an additional fee, payable to Bank, with respect to the Term Loan Advance, in an amount equal to:

(a) for a prepayment of the Term Loan Advance made on or prior to the first (1st) anniversary of the Effective Date, three percent (3.0%) of the then outstanding principal amount of the Term Loan Advance immediately prior to the date of such prepayment;

(b) for a prepayment of the Term Loan Advance made after the first (1st) anniversary of the Effective Date, but on or prior to the second (2nd) anniversary of the Effective Date, two percent (2.0%) of the then outstanding principal amount of the Term Loan Advance immediately prior to the date of such prepayment; and

(c) for a prepayment of the Term Loan Advance made after the second (2nd) anniversary of the Effective Date, but prior to the Term Loan Maturity Date, one percent (1.0%) of the then outstanding principal amount of the Term Loan Advance immediately prior to the date of such prepayment.

"**Prime Rate**" is the rate of interest per annum from time to time published in the money rates section of The Wall Street Journal or any successor publication thereto as the "prime rate" then in effect; provided that, in the event such rate of interest is less than zero, such rate shall be deemed to be zero for purposes of this Agreement and

provided further that if such rate of interest, as set forth from time to time in the money rates section of The Wall Street Journal, becomes unavailable for any reason as determined by Bank, the "Prime Rate" shall mean the rate of interest per annum announced by Bank as its prime rate in effect at its principal office in the State of California (such Bank-announced Prime Rate not being intended to be the lowest rate of interest charged by Bank in connection with extensions of credit to debtors); provided, further that, in the event such rate of interest is less than zero, such rate shall be deemed to be zero for purposes of this Agreement.

"**Qualified Subsidiary**" is any Domestic Subsidiary (other than Securities Corporation).

"**Quarterly Financial Statements**" is defined in Section 6.2(a).

"**Registered Organization**" is any "registered organization" as defined in the Code with such additions to such term as may hereafter be made.

"**Requirement of Law**" is as to any Person, the organizational or governing documents of such Person, and any law (statutory or common), treaty, rule or regulation or determination of an arbitrator or a court or other Governmental Authority, in each case applicable to or binding upon such Person or any of its property or to which such Person or any of its property is subject.

"**Responsible Officer**" is any of the Chief Executive Officer, President, Chief Financial Officer, Treasurer, Controller or Vice President of Borrower.

"**Restricted License**" is any material license or other similar material agreement with respect to which Borrower is the licensee (a) that prohibits or otherwise restricts Borrower from granting a security interest in Borrower's interest in such license or agreement or any other property, or (b) for which a default under or termination of could reasonably be expected to interfere with Bank's right to sell any Collateral. in each case, other than off-the-shelf software, open source code, application programming interfaces (APIs) and/or other trademarks, copyrights or patents of others that are commercially available to the public under shrinkwrap licenses, clickwrap licenses, online terms of service or other terms of use or similar agreements shall not constitute a Restricted License.

"**Required Amount**" is defined in Section 6.6(a).

"**SEC**" shall mean the Securities and Exchange Commission, any successor thereto, and any analogous Governmental Authority.

"**Securities Account**" is any "securities account" as defined in the Code with such additions to such term as may hereafter be made.

"**Securities Corporation**" is Genocea Securities Corp., a corporation organized under the laws of the Commonwealth of Massachusetts and a Subsidiary of Borrower.

"**Stock Pledge Agreement**" is that certain stock pledge agreement executed by Borrower in favor of Bank dated as of the Effective Date, as may be amended, modified, supplemented or restated from time to time.

"**Subordinated Debt**" is indebtedness incurred by Borrower subordinated to all of Borrower's now or hereafter indebtedness to Bank (pursuant to a subordination, intercreditor, or other similar agreement in form and substance satisfactory to Bank entered into between Bank and the other creditor), on terms acceptable to Bank.

"**Subsidiary**" is, as to any Person, a corporation, partnership, limited liability company or other entity of which shares of stock or other ownership interests having ordinary voting power (other than stock or such other ownership interests having such power only by reason of the happening of a contingency) to elect a majority of the board of directors or other managers of such corporation, partnership or other entity are at the time owned, or the management of which is otherwise controlled, directly or indirectly through one or more intermediaries, or both, by such Person. Unless the context otherwise requires, each reference to a Subsidiary herein shall be a reference to a Subsidiary of Borrower.

"**Tax**" or "**Taxes**" means all present or future taxes, charges, fees, levies, imposts, duties, deductions, withholding (including backup withholding) or other assessments or other similar charges imposed by any U.S. federal, state, local or non-U.S. Governmental Authority, including, without limitation, income, gross receipts, excise, real or personal property, sales, occupation, use, service, leasing, environmental, value added, transfer, payroll, and franchise taxes (and including any interest, penalties, or additions to tax attributable thereto).

"**Term Loan Advance**" is defined in Section 2.1.1(a).

"**Term Loan Amortization Date**" means October 1, 2021, which shall be extended until April 1, 2022, upon the occurrence of the Interest Only Extension Event.

"**Term Loan Maturity Date**" is September 1, 2023, which shall be extended until March 1, 2024 upon the occurrence of the Interest Only Extension Event.

"**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.

"**Transfer**" is defined in Section 7.1.

"**Warrant**" is that certain warrant to purchase stock dated as of the Effective Date between Borrower and Bank, as may be amended, modified, supplemented, and/or restated from time to time.

**[**Signature page follows.**]**

**IN WITNESS WHEREOF**, the parties hereto have caused this Agreement to be executed as a sealed instrument under the laws of the Commonwealth of Massachusetts as of the Effective Date.

**BORROWER:**

**GENOCEA BIOSCIENCES, INC.**

By /s/Diantha Duvall

Name: Diantha Duvall
Title: Chief Financial Officer and Secretary

**BANK:**

**SILICON VALLEY BANK**

By /s/ James Caccavaro

Name: James Caccavaro
Title: Vice President

**EXHIBIT A – COLLATERAL DESCRIPTION**

The Collateral consists of all of Borrower's right, title and interest in and to the following personal property:

All goods, Accounts (including health-care receivables), Equipment, Inventory, contract rights or rights to payment of money, leases, license agreements, franchise agreements, General Intangibles (except as provided below), commercial tort claims, documents, instruments (including any promissory notes), chattel paper (whether tangible or electronic), cash, deposit accounts, certificates of deposit, fixtures, letters of credit rights (whether or not the letter of credit is evidenced by a writing), securities, and all other investment property, supporting obligations, and financial assets, whether now owned or hereafter acquired, wherever located; and

all Borrower's Books relating to the foregoing, and any and all claims, rights and interests in any of the above and all substitutions for, additions, attachments, accessories, accessions and improvements to and replacements, products, proceeds and insurance proceeds of any or all of the foregoing.

Notwithstanding the foregoing, the Collateral does not include any (a) with respect to stock in Foreign Subsidiaries, more than sixty-five percent (65.0%) of the presently existing and hereafter arising issued and outstanding shares of capital stock owned by Borrower of any Foreign Subsidiary which shares entitle the holder thereof to vote for directors or any other matter, (b) any property to the extent that such grant of security interest is prohibited by any Requirement of Law of a Governmental Authority or constitutes a breach or default under or results in the termination of or requires any consent not obtained under, any contract, license, agreement, instrument or other document evidencing or giving rise to such property, except to the extent that such Requirement of Law or the term in such contract, license, agreement, instrument or other document providing for such prohibition, breach, default or termination or requiring such consent is ineffective under Section 9-406, 9-407, 9-408 or 9-409 of the Code (or any successor provision or provisions) of any relevant jurisdiction or any other applicable law (including the Bankruptcy Code) or principles of equity; provided, however, that such security interest shall attach immediately at such time as such Requirement of Law is not effective or applicable, or such prohibition, breach, default or termination is no longer applicable or is waived, and to the extent severable, shall attach immediately to any portion of the Collateral that does not result in such consequences; (c) Excluded Accounts, (d) any interest of Borrower as a lessee or sublessee under a real property lease or an Equipment lease if Borrower is prohibited by the terms of such lease from granting a security interest in such lease or under which such an assignment or Lien would cause a default to occur under such lease (but only to the extent that such prohibition is enforceable under all applicable laws including, without limitation, the Code); provided, however, that upon termination of such prohibition, such interest shall immediately become Collateral without any action by Borrower or Bank, and (e) Intellectual Property; provided, however, the Collateral shall include all Accounts and all proceeds of Intellectual Property.

**EXHIBIT B**

**COMPLIANCE STATEMENT**

TO: SILICON VALLEY BANK ("**Bank**") Date: _____
FROM: GENOCEA BIOSCIENCES, INC. ("**Borrower**")

Under the terms and conditions of the Loan and Security Agreement between Borrower and Bank (the "Agreement") Borrower is in compliance for the period ending _____ with all required covenants except as noted below.

Attached are the required documents evidencing such compliance, setting forth calculations prepared in accordance with GAAP consistently applied from one period to the next except as explained in an accompanying letter or footnotes. Capitalized terms used but not otherwise defined herein shall have the meanings given them in the Agreement.

**Please indicate compliance status by circling Yes/No under "Complies" column.**

| **Reporting Covenants** | **Required** | **Complies** |
|---|---|---|
| | | |
| Quarterly financial statements | Quarterly within 45 days | Yes No |
| Compliance Statements | Monthly within 30 days | Yes No |
| Annual financial statement (CPA Audited) | FYE within 90 days | Yes No |
| Board approved operating budget and projections | FYE within 90 days, and<br>promptly after any updates thereto | Yes No |
| 10-Q, 10-K and 8-K | Within 5 days after filing with SEC | Yes No |
| | | |

**Other Matters**

| | | |
|---|---|---|
| Have there been any amendments of or other changes to the Operating Documents of Borrower or any of its Subsidiaries? If yes, provide copies of any such amendments or changes with this Compliance Statement. | Yes | No |

The following are the exceptions with respect to the statements above: (If no exceptions exist, state "No exceptions to note.")

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**EXHIBIT C – LOAN PAYMENT/ADVANCE REQUEST FORM**

**Deadline for same day processing is Noon Eastern Time**

Fax To: Date: _____

| |
|---|
| **Loan Payment:** GENOCEA BIOSCIENCES, INC. |
| From Account #_____ To Account #_____ |
| (Deposit Account #) (Loan Account #) |
| Principal $_____ and/or Interest $_____ |
| Authorized Signature:__ Phone Number: __ |
| Print Name/Title: __ |
| |

| |
|---|
| **Loan Advance:** |
| Complete *Outgoing Wire Request* section below if all or a portion of the funds from this Credit Extension are for an outgoing wire. |
| From Account #_____ To Account #_____ |
| (Loan Account #) (Deposit Account #) |
| Amount of Credit Extension $_____ |
| All Borrower's representations and warranties in the Loan and Security Agreement are true, correct and complete in all material respects on the date of the request for a Credit Extension; provided, however, that such materiality qualifier shall not be applicable to any representations and warranties that already are qualified or modified by materiality in the text thereof; and provided, further that those representations and warranties expressly referring to a specific date shall be true, accurate and complete in all material respects as of such date: |
| |
| Authorized Signature:__ Phone Number: __ |
| Print Name/Title: __ |
| |

| |
|---|
| **Outgoing Wire Request:** |
| **Complete only if all or a portion of funds from the loan advance above is to be wired.** |
| Deadline for same day processing is noon, Eastern Time |
| |
| Beneficiary Name: _____ __ Amount of Wire: $__ |
| Beneficiary Bank: _____ __ Account Number: __ |
| City and State: __ |
| Beneficiary Bank Transit (ABA) #: __ Beneficiary Bank Code (Swift, Sort, Chip, etc.): __ |
| **(For International Wire Only)** |
| Intermediary Bank: __ Transit (ABA) #: __ |
| For Further Credit to: __ |
| Special Instruction: __ |
| |
| *By signing below, I (we) acknowledge and agree that my (our) funds transfer request shall be processed in accordance with and subject to the terms and conditions set forth in the agreements(s) covering funds transfer service(s), which agreements(s) were previously received and executed by me (us).* |
| |
| Authorized Signature: _____ 2nd Signature (if required): _____ |
| Print Name/Title: _____ Print Name/Title: _____ |
| Telephone #: _____ Telephone #: __ |

**EXHIBIT D – INVESTMENT POLICY**

**[* * *]**

ny-2048788

**Exhibit 23.1**

**Consent of Independent Registered Public Accounting Firm**

We consent to the incorporation by reference in the following Registration Statements:

(1) Registration Statements (Form S-3 Nos. 333-225086, 333-230577, 333-248103) of Genocea Biosciences, Inc.,

(2) Registration Statements (Form S-8 Nos. 333-230062, 333-223129, 333-216183, 333-209576, 333-202333, 333-197127, 333-236413, and 333-238878) pertaining to the Amended and Restated 2014 Equity Incentive Plan of Genocea Biosciences, Inc.,

(3) Registration Statement (Form S-8 No. 333-226655) pertaining to the Amended and Restated 2014 Equity Incentive Plan, 2014 Employee Stock Purchase Plan, as amended, and common stock issuable pursuant to Narinderjeet Singh Inducement Stock Option Agreement of Genocea Biosciences, Inc., and

(4) Registration Statement (Form S-8 No. 333-194021) pertaining to the Amended and Restated 2007 Equity Incentive Plan and 2014 Equity Incentive Plan of Genocea Biosciences, Inc.;

of our report dated February 22, 2021, with respect to the consolidated financial statements of Genocea Biosciences, Inc. included in this Annual Report (Form 10-K) of Genocea Biosciences, Inc. for the year ended December 31, 2020.

/s/ Ernst & Young LLP

Boston, Massachusetts

February 22, 2021

**Exhibit 31.1**

**PRINCIPAL EXECUTIVE OFFICER CERTIFICATION**

I, William D. Clark, certify that:

1. I have reviewed this Annual Report on Form 10-K of Genocea 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 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, 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 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.

/s/ WILLIAM D. CLARK
William D. Clark
President and Chief Executive Officer and Director
*(Principal Executive Officer)*

Date: February 22, 2021

**Exhibit 31.2**

**PRINCIPAL FINANCIAL OFFICER CERTIFICATION**

I, Diantha Duvall, certify that:

1. I have reviewed this Annual Report on Form 10-K of Genocea 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 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, 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 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.

/s/ DIANTHA DUVALL
Diantha Duvall
Chief Financial Officer

Date: February 22, 2021

**Exhibit 32**

**CERTIFICATIONS PURSUANT TO 18 U.S.C. SECTION 1350,
AS ADOPTED PURSUANT TO SECTION 906 OF THE
SARBANES-OXLEY ACT OF 2002**

I, William D. Clark, certify to the best of my knowledge, pursuant to 18 U.S.C. Section 1350, as adopted pursuant to Section 906 of the Sarbanes-Oxley Act of 2002, that the Annual Report of Genocea Biosciences, Inc. on Form 10-K for the year ended December 31, 2020 fully complies with the requirements of Section 13(a) or 15(d) of the Securities Exchange Act of 1934 and that information contained in such Form 10-K fairly presents in all material respects the financial condition and results of operations of Genocea Biosciences, Inc. at the dates and for the periods indicated.

/s/ WILLIAM D. CLARK
William D. Clark
President and Chief Executive Officer and Director

Date: February 22, 2021

I, Diantha Duvall, certify to the best of my knowledge, pursuant to 18 U.S.C. Section 1350, as adopted pursuant to Section 906 of the Sarbanes-Oxley Act of 2002, that the Annual Report of Genocea Biosciences, Inc. on Form 10-K for the year ended December 31, 2020 fully complies with the requirements of Section 13(a) or 15(d) of the Securities Exchange Act of 1934 and that information contained in such Form 10-K fairly presents in all material respects the financial condition and results of operations of Genocea Biosciences, Inc. at the dates and for the periods indicated.

/s/ DIANTHA DUVALL
Diantha Duvall
Chief Financial Officer

Date: February 22, 2021