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

FORM 10-K

(Mark One)

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

For the fiscal year ended December 31, 2021

or

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

For the transition period from _____ to _____

Commission File Number: 001-33958

SELLAS Life Sciences Group, Inc.

(Exact name of registrant as specified in its charter)

Delaware	**20-8099512**
(State of incorporation)	*(I.R.S. Employer Identification No.)*

7 Times Square, Suite 2503, New York, NY 10036
(Address of principal executive officers)
(646) 200-5278
(Registrant's telephone number, including area code)

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

Title of Each Class	Trading Symbol(s)	Name of Each Exchange on Which Registered
Common Stock, $0.0001 Par Value per share	SLS	The Nasdaq Stock Market LLC

Securities registered pursuant to Section (12(g) of the Exchange 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 Exchange Act. Yes ☐ No ☒

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

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

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

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

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

Indicate by check mark whether the registrant has filed a report on and attestation to its management's assessment of the effectiveness of its internal control over financial reporting under Section 404(b) of the Sarbanes-Oxley Act (15 U.S.C. 7262(b)) by the registered public accounting firm that prepared or issued its audit report. ☐

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, $0.0001 per value per share, held by non-affiliates of the registrant on June 30, 2021, the last business day of the registrant's most recently completed second fiscal quarter, was $176,103,964 (based on the closing sales price of the registrant's common stock on that date). Shares of the registrant's common stock held by each officer and director and each person who owns 5% or more of the outstanding common stock of the registrant have been excluded in that such persons may be deemed to be affiliates. This determination of affiliate status is not necessarily a conclusive determination for other purposes. As of March 30, 2022, SELLAS Life Sciences Group, Inc. had outstanding 15,905,999 shares of common stock, $0.0001 par value per share, exclusive of treasury shares.

DOCUMENTS INCORPORATED BY REFERENCE

Certain information required in Part III of this Annual Report on Form 10-K is incorporated from the registrant’s Proxy Statement for its 2022 Annual Meeting of Stockholders to be filed with the Securities and Exchange Commission pursuant to Regulation 14A not later than 120 days after the end of the fiscal year covered by this Form 10-K, provided that if such Proxy Statement is not filed within such period, such information will be included in an amendment to this Form 10-K to be filed within such 120-day period.

SPECIAL NOTE REGARDING FORWARD LOOKING STATEMENTS

Some of the information contained in this annual report on Form 10-K may include forward-looking statements that reflect our current views with respect to our development programs, business strategy, business plan, financial performance and other future events. These statements include forward-looking statements both with respect to us, specifically, and our industry, in general. Such forward-looking statements include the words "expect," "intend," "plan," "believe," "project," "estimate," "may," "should," "anticipate," "will" and similar statements of a future or forward-looking nature identify forward-looking statements.

Forward-looking statements are neither historical facts nor assurances of future performance. Instead, they are based only on our current beliefs, expectations and assumptions regarding the future of our business, future plans and strategies, projections, anticipated events and trends, the economy and other future conditions. Forward-looking statements are subject to inherent uncertainties, risks and changes in circumstances that are difficult to predict and many of which are outside of our control. The COVID-19 pandemic has caused a widespread health crisis that could adversely affect the economies and financial markets of many countries, resulting in an economic downturn that could impact our operating results. We expect the COVID-19 pandemic may continue to have both a direct and an indirect impact on our business operations and financial results; the extent of the impact on our clinical development and regulatory efforts, our corporate development objectives, our financial position and the value of and market for our common stock will depend on future developments that are highly uncertain and cannot be predicted with confidence at this time, such as the ultimate duration of the pandemic, the emergence of new variants, travel restrictions, quarantines, social distancing and business closure requirements in the United States and in other countries, and the effectiveness of actions taken globally to contain and treat the disease, including the availability of safe and effective vaccines and the uptake thereof. There are or will be important factors that could cause actual results to differ materially from those indicated in these statements. These factors include, but are not limited to, those factors set forth in the sections captioned "Business – Overview," "Risk Factors," "Legal Proceedings," and "Management's Discussion and Analysis of Financial Condition and Results of Operations," in this annual report on Form 10-K, which you should review carefully. We undertake no obligation to publicly update or review any forward-looking statement, whether as a result of new information, future developments or otherwise, except as required by law.

SELLAS LIFE SCIENCES GROUP, INC.
FORM 10-K - Annual Report
For the Year Ended December 31, 2021

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Unless the context otherwise indicates, references in these notes to the “Company,” “we,” “us” or “our” refer to SELLAS Life Sciences Group, Inc. and its wholly owned subsidiaries.

SUMMARY OF PRINCIPAL RISK FACTORS

This summary briefly lists the principal risks and uncertainties facing our business, which are only a select portion of those risks. A more complete discussion of those risks and uncertainties is set forth in Part I, Item 1A of this Annual Report, entitled “Risk Factors”. Additional risks not presently known to us or that we currently deem immaterial may also affect us. If any of these risks occur, our business, financial condition or results of operations could be materially and adversely affected. Our business is subject to the following principal risks and uncertainties:

- We have incurred substantial losses since our inception and anticipate that we will continue to incur substantial and increasing losses for the foreseeable future as we continue development and, subject to positive data and regulatory approval, commercialization of our product candidates.
- We currently have no source of product revenues. We may never generate such revenues or achieve profitability.
- We will need additional financing to fund our operations and complete the development and, subject to positive data and regulatory approval, the commercialization of our product candidates. If we are unable to raise capital when needed, we could be forced to delay, reduce or eliminate our development programs or commercialization efforts.
- Our lead product candidate galinpepimut-S, or GPS, represents a new therapeutic approach that presents significant challenges.
- Our business, in particular our clinical development programs, has been and may continue to be adversely affected by the COVID-19 pandemic.
- We may find it difficult to enroll patients in our clinical trials due to the impact of COVID-19 and given the limited number of patients who have the diseases for which our product candidates are being studied which could delay or prevent the start of clinical trials for our product candidates.
- Clinical drug development involves a lengthy and expensive process with an uncertain outcome. Our existing product candidates in clinical trials, and any other product candidates that may advance into clinical trials, may not have favorable results in later clinical trials or receive regulatory approval.
- Our current and future product candidates, the methods used to deliver them or their dosage levels may cause undesirable side effects or have other properties that could delay or prevent their regulatory approval, limit the commercial profile of an approved label or result in significant negative consequences following any regulatory approval.
- Our current and future product candidates could fail to receive regulatory approval from the FDA.
- Failure to obtain regulatory approval in international jurisdictions would prevent our product candidates from being marketed abroad.
- We have limited to no manufacturing, sales, marketing or distribution capability and must rely upon third parties for such.
- If any of the clinical manufacturing facilities of our contract manufacturing organizations, or CMOs, are damaged or destroyed or production at such facilities is otherwise interrupted, our business and prospects would be negatively affected.
- We rely on third parties to conduct our preclinical studies and clinical trials. If these third parties do not successfully carry out their contractual duties or meet expected deadlines, or if we lose any of our contract

research organizations, or CROs, or other key third-party vendors, we may not be able to obtain regulatory approval for or commercialize our current or future product candidates on a timely basis, if at all.

- We have in-licensed a significant portion of our intellectual property from Memorial Sloan Kettering Cancer Center, or MSK. If we breach our license agreement with MSK, we could lose the ability to continue the development and potential commercialization of GPS.
- We may not be able to obtain and enforce patent rights or other intellectual property rights that cover our product candidates and that are of sufficient breadth to prevent third parties from competing against us.
- Our pending and future patent applications, and any collaboration or commercialization partner's pending and future patent applications, may not result in patents being issued which protect our technology or products, in whole or in part, or which effectively prevent others from commercializing competitive technologies and products.
- Our product candidates may face biosimilar competition sooner than expected after the expiration of our composition of matter patent protection for such products.
- Our commercial success depends upon attaining significant market acceptance of our current and future product candidates, if approved, among physicians, patients, healthcare payors and cancer treatment centers.
- Even if we are able to commercialize our current or future product candidates, the products may not receive coverage and adequate reimbursement from third-party payors in the United States and in other countries in which we seek to commercialize our products, which could harm our business.
- We have been involved in multiple legal and governmental proceedings, including securities class action litigation, and may in the future be involved in proceedings, relating to the commercial activities of our predecessor that could divert management's attention and adversely affect our financial condition and our business.
- If we fail to maintain an effective system of internal control over financial reporting, we may not be able to accurately report our financial results or prevent fraud. As a result, stockholders could lose confidence in our financial and other public reports, which would harm our business, the trading price of our common stock and our ability to raise additional capital in the future.
- We face substantial competition, which may result in others discovering, developing or commercializing products before or more successfully than we do.
- Significant disruptions of information technology systems, computer system failures or breaches of information security could adversely affect our business.
- We will need to secure additional capital which may cause dilution to you and our existing stockholders, provide subsequent investors with rights and preference that are senior to yours, restrict our operations or require us to relinquish rights to our product candidates on unfavorable terms to us.

PART I

ITEM 1. BUSINESS

Overview

We are a late-stage clinical biopharmaceutical company focused on developing novel cancer immunotherapeutics for a broad range of cancer indications. Our product candidates currently include galinpepimut-S, or GPS, and nelipepimut-S, or NPS.

Galinpepimut-S

Our lead product candidate, GPS, is a cancer immunotherapeutic agent licensed from Memorial Sloan Kettering Cancer Center, or MSK, that targets the Wilms tumor 1, or WT1, protein, which is present in 20 or more cancer types. Based on its mechanism of action as a directly immunizing agent, GPS has potential as a monotherapy or in combination with other immunotherapeutic agents to address a broad spectrum of hematologic, or blood, cancers and solid tumor indications.

In January 2020, we commenced in the United States a Phase 3 clinical trial, the REGAL study, for GPS monotherapy in patients with acute myeloid leukemia, or AML, in the maintenance setting after achievement of second complete remission, or CR2, following successful completion of second-line antileukemic therapy. We expect this study will be used as the basis for submission of a Biologics License Application, or BLA, subject to a statistically significant and clinically meaningful data outcome and agreement with the U.S. Food & Drug Administration, or the FDA. We plan to enroll approximately 116 patients at up to approximately 85 clinical sites in the United States, Europe and Asia with a planned interim safety and futility analysis after 80 events (deaths). Under our current planning assumptions, which take into account our best estimates of potential delays due to COVID-19, we believe that we will complete enrollment for the REGAL study in late 2022 or early in the first quarter of 2023. Based upon these current assumptions with respect to completion of enrollment and the estimated survival times for both the treated and control groups in the study, we believe, after discussions with our external statisticians and experts, that the planned interim analysis after 80 events (deaths) per the protocol will occur by the end of the first half of 2023, provided that our statistical assumptions and assumptions regarding the impact of COVID-19 on the operations of our clinical sites as well as the duration of the pandemic remain unchanged. Because this analysis is event driven, it may occur at a different time than currently expected.

In December 2020, we entered into an exclusive license agreement with 3D Medicines Inc., a China-based biopharmaceutical company developing next-generation immuno-oncology drugs, for the development and commercialization of GPS, as well as the Company's next generation heptavalent immunotherapeutic GPS+, which is at preclinical stage, across all therapeutic and diagnostic uses in the Greater China territory (mainland China, Hong Kong, Macau and Taiwan). We have retained sole rights to GPS and GPS+ outside of the Greater China area. In January 2022, we announced that an IND application filed by 3D Medicines to initiate the first clinical trial in China for 3D189, also known as GPS, has been accepted by China's National Medical Products Administration ("NMPA"). The IND is for a small Phase I clinical trial investigating safety. On March 30, 2022, the IND was approved by the NMPA triggering a $1.0 million milestone payment to the Company which is expected to be received in the second quarter of 2022.

In December 2018, pursuant to a Clinical Trial Collaboration and Supply Agreement, we initiated a Phase 1/2 multi-arm "basket" type clinical study of GPS in combination with Merck & Co., Inc.'s anti-PD-1 therapy, Keytruda® (pembrolizumab). In 2020, we, together with Merck determined to focus on ovarian cancer (second or third line). We reported updated clinical and initial immune response data from this study in June 2021. In February 2022 we reported that we had completed enrollment of 17 evaluable patients in this study. Data from 15 of the 17 evaluable patients is expected to be examined by mid-2022, with final data analysis for all evaluable patients expected by the end of 2022.

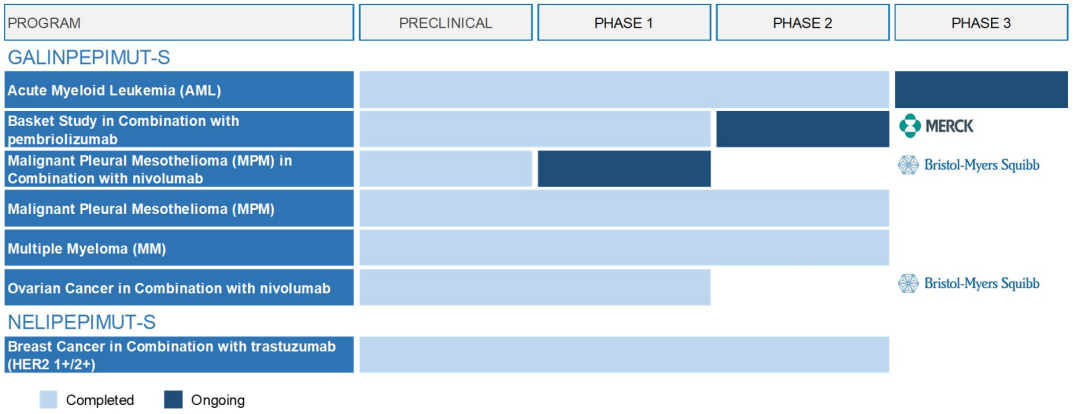
In February 2020, a Phase I open-label investigator-sponsored clinical trial of GPS, in combination with Bristol-Myers Squibb's anti-PD-1 therapy, nivolumab (Opdivo®), in patients with malignant pleural mesothelioma, or MPM, who harbor relapsed or refractory disease after having received frontline standard of care multimodality therapy was commenced at MSK. In June 2021, we announced updated data from this study. Completion of enrollment of a target total of 10 evaluable patients is expected during the second half of 2022. We expect to report additional clinical and immune response data in the first half of 2022.

GPS was granted Orphan Drug Product Designations from the FDA, as well as Orphan Medicinal Product Designations from the European Medicines Agency, or EMA, for GPS in AML, MPM, and multiple myeloma, or MM, as well as Fast Track Designation for AML, MPM, and MM from the FDA.

Nelipepimut-S

NPS is a cancer immunotherapy targeting the human epidermal growth factor receptor 2, or HER2, expressing cancers. Data presented in 2018 from a Phase 2b clinical trial of the combination of trastuzumab (Herceptin®) plus NPS in HER2 low expressing (1+ or 2+ per immunohistochemistry, or IHC) breast cancer patients in the adjuvant setting to prevent recurrences showed a clinically and statistically significant improvement in the disease-free survival, or DFS, rate for the cohort of patients with triple negative breast cancer, or TNBC, at 24 months for patients treated with NPS plus trastuzumab of 92.6% compared to 70.2% for those treated with trastuzumab alone. Since 2018, largely based on this data, we have been seeking out-licensing opportunities to fund and conduct the future clinical development of NPS in TNBC in order to maximize the potential of the program as we do not plan to conduct and fund a Phase 3 program for NPS on our own. After extensive effort, we have concluded that continued efforts to outlicense NPS for further development for breast cancer are unlikely to result in a licensing transaction commensurate with the value of the asset which we believe is due to the changing market for breast cancer therapies, the scope, cost and timeline for a Phase 3 trial which would satisfy regulatory requirements for the TNBC indication and the failure, in 2016, of the Phase 3 clinical trial of monotherapy NPS in breast cancer. As we continue our out-licensing strategy, we are now focusing on the potential for NPS in other cancer indications.

The chart below summarizes the current status of our clinical development pipeline:



Merger of SELLAS Life Sciences Group Ltd. and Galena Biopharma, Inc.

On December 29, 2017, we completed the business combination with the privately held Bermuda exempted company, Sellas Life Sciences Group Ltd., or Private SELLAS, in accordance with the terms of the Agreement and Plan of Merger and Reorganization, dated as of August 7, 2017 and amended November 5, 2017, or the Merger Agreement, among SELLAS Life Sciences Group, Inc., Sellas Intermediate Holdings I, Inc., Sellas Intermediate Holdings II, Inc., Galena Bermuda Merger Sub, Ltd., and Private SELLAS. We refer to this business combination throughout this annual report on Form 10-K as the Merger.

As a result of the Merger, our business is now substantially comprised of the business of Private SELLAS, and our financial statements became those of Private SELLAS. Upon completion of the Merger, we changed our name from “Galena Biopharma, Inc.” to “SELLAS Life Sciences Group, Inc.,” our common stock began trading on The Nasdaq Capital Market, or Nasdaq, under a new ticker symbol “SLS” on January 2, 2018.

As used in this annual report on Form 10-K, the words “we,” “us,” “our,” the “Company,” and “SELLAS” refer to SELLAS Life Sciences Group, Inc. and its consolidated subsidiaries following completion of the Merger.

The Cancer Immunotherapy Industry

Overview

Current treatments for cancer include surgery, radiation therapy, chemotherapy, hormone therapy, targeted therapy and immunotherapy. Cancer immunotherapy is an approach to cancer treatment that harnesses the body's natural immune system response to fight and/or prevent tumor growth while keeping normal cells unaffected or delivering certain immune system components in order to inhibit the spread of cancer. In recent years, cancer immunotherapy drugs have emerged as a new mode of cancer treatment, alongside more established options such as surgery, chemotherapy, targeted therapy and radiation therapy.

Either as monotherapy or in combination therapies, immunotherapies may produce long-term remissions or even operational "cures" for cancers that have often been fatal until recently. Cancer immunotherapy is an important and rapidly emerging field, which has led to exciting new clinical research studies and garnered the attention of investors, biotechnology and pharmaceutical companies, regulatory agencies, payors and hospital systems, cancer patients and their families and the general public at large.

Market

According to a January 2021 report by Kelly Scientific Publications, cancer immunotherapy drugs have captured nearly 50% of the overall oncology drugs market, generating approximately $75 billion in 2019 and are forecasted to surpass $143 billion in 2025. A July 2021 Allied Market Research has estimated that the global cancer immunotherapy market could reach $309.6 billion by 2030, growing at a compound annual growth rate, or CAGR, of 14.1%. The global immunotherapy market is currently comprised of bi-specific monoclonal antibodies and immune response co-stimulators, checkpoint inhibitors, and other immunotherapies including chimeric antigen receptor (CAR) T-cell therapies, other cell-based modalities and novel therapies. It is predicted that the checkpoint inhibitor market share will decrease slightly by 2023, from approximately 30% in 2019 to approximately 27% value, as novel therapies, including peptide cancer active immunizers (vaccines) such as our product candidates, GPS and NPS, and cell-based therapies, advance into regulatory approvals and use in the cancer market.

With respect to the market for AML, a June 2021 report from DelveInsight estimates a global market size of $5.09 billion by the end of 2030, with a CAGR of 21.85% from 2018 to 2030. The total number of newly diagnosed patients with AML per year in the United States is approximately 20,050 (2022 epidemiological data: American Cancer Society). It is estimated that the number of adult patients of any age with AML in the United States per year who successfully enter into CR2, the indication of our REGAL study, is approximately 2,000 patients and approximately 4,700 patients outside of the United States in the rest of the world, or ROW, while the number of patients who achieve first complete remission, or CR1, is estimated to be approximately 16,400 patients in the United States and approximately 38,100 patients ROW. The number of patients potentially eligible for GPS maintenance therapy after achievement of CR2 status is approximately 1,200 patients in the United States and approximately 2,800 patients ROW.

Products/Pipeline

Galinpepimut-S (GPS)

Overview

GPS is a WT1-targeting peptide-based cancer immunotherapeutic being developed as a monotherapy and in combination with other therapeutic agents to treat different types of cancers that result from uninhibited tumor cell growth. GPS targets malignancies and tumors characterized by an overexpression of the WT1 protein. The WT1 protein is one of the most widely expressed cancer proteins in multiple malignancies. A 2009 pilot project regarding the prioritization of cancer antigens (substances that evoke an immune response) conducted by the National Cancer Institute, or NCI, a division of the National Institutes of Health, or NIH, ranked the WT1 protein as a top priority for immunotherapy.

WT1 is a protein that resides in the cell's nucleus and participates in the process of cancer formation and progression. As such, it is classified as an "oncogene." WT1 plays a key role in the development of the kidneys in fetal life, but then almost disappears from normal organs and tissues. In a wide variety of cancers (20 or more cancer types), WT1 becomes detectable again in at least 50% of tumor pathology specimens in the cells of these cancers. WT1 appears in large amounts (*i.e.*, becomes "overexpressed") in numerous hematological malignancies, including AML, MM and chronic myeloid leukemia, as well as in many solid malignancies such as MPM, gastrointestinal cancers (such as colorectal cancer), glioblastoma multiforme, TNBC, ovarian cancer and small cell lung cancer, or SCLC.

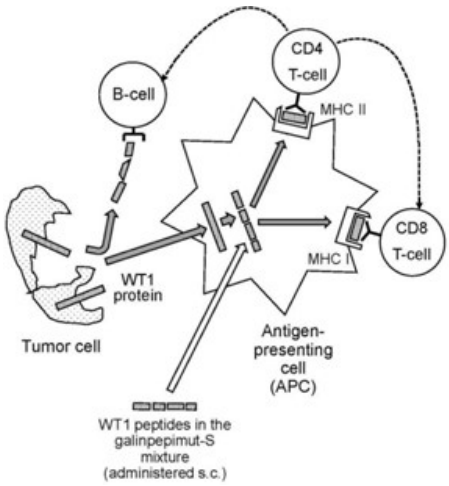
Mechanism of Action in Immune System

GPS is a multi-peptide product that has been modified to enhance the degree and duration of the immune response against the WT1 protein. The modification is based on the fact that two of the four peptides in the peptide mixture comprising GPS are deliberately mutated in a single amino acid residue. These mutated peptides are recognized by the immune system as non-self-entities and are therefore less likely to induce immune tolerance. After administration of these mutated peptides, the patients become immunized against the corresponding native versions of these peptides (which are expressed by the tumor cells), and thus, are able to cross-react against them, which concept is called the heteroclitic principle.

We believe that GPS has a mechanism of action that involves direct activation of the patient's immune system specifically and solely against the WT1 protein. Although the immune system is designed to identify foreign or abnormal proteins expressed on tumor cells, this process is often defective in cancer patients. Typically, patients harboring WT1-positive malignancies have very few or no T cells specifically reactive or responsive to, and therefore activated by, WT1. T cells are involved in both sensing and killing abnormal cells, in addition to coordinating the activation of other cells in an immune response. T cells can be classified into two major subsets, CD4 cells and CD8 cells. CD8 cells are characterized by a CD8 protein on their cell surface that allow them to recognize, bind and kill cells infected by cancer cells. CD4 cells, known as helper T cells, are critical to providing the signals necessary for sustained CD8 cell responses and are also capable of exerting direct anti-tumor activity. GPS is designed to elicit both CD4 and CD8 cell immune responses. We believe that the activation of CD8 cells by GPS could lead to direct cancer cell killing, or cytotoxicity, and the eventual establishment of immunologic memory against a WT1-expressing cancer. This occurs by two mechanisms: (i) conversion of some of the activated CD8 cells to CD8 memory cells, and (ii) activation of CD4 cells and the eventual creation of CD4 terminal effective memory cells.

We believe that, with respect to the conversion of activated CD8 cells, the GPS stimulated CD8 cells transform into cytotoxic T-lymphocytes, or CTLs, which are expected to be able to attack and destroy specifically WT1-positive cancer cells. Each CTL typically destroys one WT1-positive cancer cell, but they have been shown to be able to kill up to 10 to 20 WT1-positive cancer cells. Further, with respect to the activation of CD4 cells, we believe that CD4 cells are stimulated to produce WT1-specific helper T cells, which are able, in turn, to activate CTLs and B cells. The B-cells "helped" by the helper T cells produce antibodies to specific WT1 epitopes. The anti-cancer effect is considered to be a result of a combination of all of the above actions, as well as possible additional, less clear mechanisms involving other immune cell types (*e.g.*, natural killer cells) that are not as widely understood.

The following diagram illustrate GPS' mechanism of action:



GPS cannot be administered to patients in a water-soluble form, and so it is given under the skin, or subcutaneously. If administered on its own, GPS would rapidly degrade and would not have the opportunity to activate the immune system. Therefore, GPS is mixed with Montanide™, a commercially available, non-specific immune adjuvant composed of a natural metabolizable oil and a very refined emulsifier, creating a dense emulsion. Montanide is co-administered with GPS by subcutaneous injection to optimally activate cellular and humoral immune responses in vaccinated patients. Additionally, prior to the administration of GPS, patients receive another immune adjuvant, granulocyte-macrophage colony-stimulating factor, or GM-CSF, to non-specifically stimulate and activate antigen-presenting cells, or APCs, in the vicinity of the subcutaneous injection of GPS.

After subcutaneous injection, the WT1 peptides within GPS disperse locally underneath the injection site and at local lymph nodes and are ingested by APCs. Digested peptide fragments are then presented on the surface of APCs to CD8 and CD4 lymphocytes while simultaneously associated on the cell membrane with major histocompatibility complexes, or MHC, human leukocyte antigen, or HLA, molecules. This process activates the CD4 and CD8 cells and sensitizes them to the key 25 epitopes of WT1, thus initiating the process of short- and long-term T-cell-mediated immunity against WT1.

Key Features

The following table summarizes the key features of GPS:

Key features of an Optimal Cancer Active Immunizer Therapeutic	**GPS Properties and Clinical Strategy**
Selecting the right target antigen and epitopes within that antigen	Four peptides and 25 epitopes selected optimally with the objective of ensuring: - optimal MHC complex presentation; - specificity across different HLA types; - production of both CD4 and CD8 activated cells; and - the ability to apply the heteroclitic principle, as described above, to overcome tolerance.
Optimal T-cell engagement leading to cancer cell destruction	Immune response data from the final analysis of the Phase I clinical study of GPS in MM in 12 evaluable patients that were presented at the 44th Annual Meeting of the European Society for Blood and Marrow Transplantation, or EBMT, in 2018 (Dr. Kohne et al.) showed 75% frequency of either CD8+ or CD4+ responses to an all-pool mixture of WT1-derived antigens after completion of the 12 vaccinations per the study protocol. This evidence of multi-epitope, broad cross-reactivity along the full-length of the WT1 protein is suggestive of epitope spreading, as it emerged across epitopes against which the patients were not specifically immunized. These data corroborate the results of an earlier analysis in mid-2017 and strongly suggest stimulation of T cells towards intracellular antigen fragments from GPS-induced destruction of tumor cells, which effect is a hallmark of an effective vaccine, e.g., that it is targeting the right epitopes chosen by design.
Overcoming the barriers of an adverse/immunosuppressive tumor micro-environment, or TME	The GPS monotherapy clinical studies are in the setting of complete remission, or CR, and minimal residual disease, or MRD, whereby no bulky or measurable tumor deposits exist. This is typically seen after successful frontline therapy in select cancer types for which such debulking standard therapies exist (e.g., AML or MPM). In these settings, the tumor micro-environment, or TME, is substantially absent. We are also pursuing combination therapy with checkpoint inhibitors in tumor settings whereby measurable disease exists, as contemporaneous checkpoint inhibition would abrogate the immunosuppressive effects of the TME.
Overcoming or mitigating immune tolerance	Heteroclitic peptides are those in which mutations have been deliberately introduced in the amino acid sequence. The use of heteroclitic peptide in an active immunizer, such as GPS, increases immunogenicity without changes in the antigenicity profile, as well as strengthens MHC binding of the peptide to produce cytotoxic CD8 cells that continue to recognize the corresponding native peptide sequence. This is believed to be a key factor differentiating GPS from essentially all previously developed peptide vaccines, and applies a highly innovative technology platform, peptide heteroclicity, in a clinical late-stage cancer immunotherapeutic candidate product.
Addressing the broadest possible candidate patient population	GPS has activity across multiple HLA types that could allow treatment of a vast majority of global patient populations harboring WT1-positive malignancies.

Potential Key Differentiators

GPS' potential key differentiators as compared to other active immunization or vaccine-type approaches, as well as compared to immunotherapy approaches more generally, are as follows:

- heteroclitic peptides may offer increased immune response and less potential for tolerance;
- multivalent oligopeptide mixture potentially drives differentiated immunotherapeutic efficacy, targeting 25 key epitopes of WT1;
- potentially applicable to 20 or more cancer types worldwide and the vast majority of HLA types;
- CR or MRD status (after initial tumor debulking with preceding standard therapy) is the preferred setting for GPS monotherapy;
- not directly competitive with current clinical standard of care therapies, but rather believed to complement them in the maintenance setting;
- potential for combination approaches with other cancer immunotherapies, due to tolerable adverse event profile;
- anticipated cost-effective manufacturing; allogeneic, "off-the-shelf," vialed subcutaneously administered drug that is not patient-specific; and
- positive Phase 2 clinical data on effectiveness (based on overall survival, or OS, in AML and progression-free survival, or PFS, in MM) with good tolerability and a favorable safety profile.

Development Program for GPS

GPS has the potential as a monotherapy or in combination with other immunotherapeutic agents to address a broad spectrum of hematologic, or blood, cancers and solid tumor indications. We are currently exploring the potential role for GPS in both monotherapy and in combination therapy with checkpoint inhibitors such as PD-1 inhibitors as set forth in the table below:

Program	***Status***
GPS Monotherapy	
• Registrational Phase 3 REGAL open-label randomized clinical trial in AML patients who have achieved hematologic complete remission, with or without thrombocytopenia (CR2/CR2p), after second-line antileukemic therapy and who are deemed ineligible for, or unable to undergo, allogeneic stem-cell transplantation	*Ongoing*
• Phase 1 clinical trial of 3D189 (GPS) in China (our licensee, 3D Medicines is the sponsor)	*IND has been filed*
• Phase 1 clinical trial in patients with hematologic and thoracic malignancies with no demonstrable residual/recurrent disease after debulking therapy	*Completed; final data reported*
• Phase 2 clinical trial in patients with AML with first complete remission (CR1) patients	*Completed; final data reported*
• Phase 2 clinical trial in patients with high-risk MDS or AML patients with ≥2 lines of prior therapy (CR2)	*Completed; final data reported*
• Phase 2 clinical trial in MM patients	*Completed; final data reported*
• Phase 2 randomized, double-blind, placebo-controlled clinical trial in MPM patients	*Completed; final data reported*
GPS Combination Therapy	
• Phase 1/2 clinical trial of GPS in combination with the anti-PD-1 therapy pembrolizumab (Keytruda) in ovarian cancer (second or third line) in collaboration with a Merck & Co., Inc., Kenilworth, N.J., U.S. subsidiary (known as MSD outside the United States and Canada), or Merck	*Enrollment complete; data expected in 1H 2022*
• Phase I open-label investigator-sponsored clinical trial of GPS, in combination with Bristol-Myers Squibb's anti-PD-1 therapy, nivolumab (Opdivo), in patients with MPM who harbor relapsed or refractory disease after having received frontline standard of care multimodality therapy	*Ongoing*
• Phase 1/pilot open-label, non-randomized clinical trial of GPS in combination with nivolumab in patients with WT1-expressing (WT1+) recurrent ovarian, fallopian tube or primary peritoneal cancer who were in second or greater clinical remission (after their successful first or subsequent "salvage" therapy)	*Completed; final data reported*

GPS Monotherapy for Acute Myeloid Leukemia (AML)

AML is an aggressive and potentially lethal blood cancer characterized by the rapid growth of abnormal white blood cells that build up in the bone marrow and interfere with the production of normal blood cells. Its symptoms include fatigue, shortness of breath, bruising and bleeding, and increased risk of infection. The cause of AML is unknown, and the disease is typically fatal within weeks or months if untreated. AML most commonly affects adults, and its incidence increases with age.

We chose AML, for which we have been granted Fast Track and Orphan Drug designations by the FDA, as our lead indication for GPS for the reasons outlined below:

- AML presents a clinical setting in which complete remission status (specifically CR1 and/or CR2) can be achieved with standard antileukemic therapy;
- the high degree of unmet medical need in recurrent/relapsed AML and the absence of an effective maintenance therapy over the decades after salvage re-induction until and immediately after achievement of CR2 status, especially considering that most patients in this clinical scenario are older than 60 years of age;
- the almost universal expression of WT1 in leukemic blasts, which are AML's replicating malignant cells, as well as leukemic stem cells, or LSCs, cells that are or become extremely resistant to standard chemotherapy or targeted agent approaches and which can be realistically eradicated only with immunotherapy methods (including allo-HSCT). LSCs have been shown to be susceptible to targeting by cytotoxic T cells (CD8 and CD4 cells) stimulated against leukemia-associated antigens and we believe this will be the case for GPS;
- the fact that WT1 has been associated with the actual development of leukemia;
- the positive correlation between the level of expression of WT1 and the prognosis in AML;
- the fact that the level of expression of WT1 can be followed over time in patients during and after therapy, including immunotherapy, as a method of monitoring for MRD;
- early evidence from mouse models that vaccination with peptides against select WT1 antigenic epitopes leads to detection of immune response;
- early evidence that human immunocytes sensitized ex-vivo to peptides contained in GPS were able to recognize naturally presented WT1 peptides on the surface of several leukemia cell lines;
- early anecdotal (at the time) clinical data showing antileukemic activity of WT1 monovalent vaccines in the CR1 maintenance setting in the Japanese population (albeit restricted to HLA-A*2401 type), as well as a dendritic cell vaccine in the Netherlands (independent of HLA haplotype) in the same setting;
- a predictive assumption of very low to negligible degree of clinical toxicity with a WT1-targeted immunotherapy such as GPS, due to the fact that WT1 in normal, non-cancerous, tissues is both expressed at extremely low levels and limited in number of organs and tissues, but also due to the fact that WT1 fragments, or peptide epitopes, in normal cells are presented to host APCs in a different manner than are WT1 fragments produced in cancer cells; of note, WT1 expression in normal tissues of adults is limited to the podocyte layer of the glomerulus (kidney), Sertoli cells (testis), granulosa cells (ovary), decidual cells (uterus), mesothelial cells (peritoneum, pleura), mammary duct and lobule (breast), and blood-forming (hematopoietic) progenitor cells (CD34+ cells in the bone marrow);
- the advent of modern immunotherapeutics in cancer and the promise of an innovative, off-the-shelf potentially effective, low adverse event burden immunotherapy to prevent or delay relapse in patients once they achieve complete remission status in AML, a disease that has historically been associated with dearth of deep and sustained responses to checkpoint inhibitors; and

- evidence from our completed Phase 1 and Phase 2 clinical trials that administration of GPS can lead to extended relapse free survival and overall survival especially in patients who demonstrated clear WT1 specific CD4 and/or CD8 immune response to GPS administration.

Furthermore, we believe that there is a significant unmet medical need for a clinically safe and effective therapy as maintenance after AML patients achieve CR1 and/or CR2 status following successful first-line or, second-line (salvage) therapies, as a significant percentage of these patients are ineligible for, or unable to undergo, allo-HSCT. No third-line therapies have shown demonstrable clinical impact to date in AML patients after their second relapse and eventually AML patients in second relapse generally succumb to AML or complications associated therewith.

Current AML Treatment Therapies

Until recently, the overall treatment landscape for AML had remained static for decades, as numerous targeted and antiproliferative agents were unsuccessful in providing meaningful long-term clinical benefits, including increments in survival. In recent years, additional drugs have been approved and current standard treatments include chemotherapy (including the fixed-combination of chemotherapy Vyxeos), hypomethylating agents, or HMAs, drugs that target mutations of the isocitrate dehydrogenase, type-1 and -2 proteins and the FMS-like tyrosine-protein kinase, FLT3, proteins in patients whose disease harbors these genetic aberrations, the B-cell lymphoma 2 inhibitor venetoclax (typically in combination with chemotherapy or HMAs), the CD33-targeting antibody-drug conjugate gemtuxumab osogamicin, and the sonic hedgehog signaling inhibitor glasdegib. Select patients could also undergo an allogeneic hematopoietic, or blood-forming, stem cell transplant, or allo-HSCT. The potential effect of newer agents on overall survival has not yet been confirmed in large controlled clinical trials. One of the fundamental goals of therapy for AML, both in the upfront and salvage settings, is for the patient to achieve a state of complete remission. Complete remission is defined per consensus criteria by the European Leukemia Net, whereby the hematologic and clinical features of the disease are no longer detected. In the first line setting, once AML patients achieve a status of first complete remission (CR1) they have two options for a meaningful long-term benefit: allo-HSCT and maintenance therapy with the oral form of the HMA azacytidine, which was recently approved for use by the FDA. In the second line setting, i.e., in AML patients who have relapsed and are receiving salvage antileukemic therapy, we are not aware of any therapies, other than allo-HSCT, that have shown through rigorous blinded, randomized, controlled clinical trials to offer a meaningful long-term benefit (either relapse-free or overall survival) when used as maintenance after patients achieve a status of CR2. Once the disease relapses after second-line therapy, patients have limited options which currently include off-label administration of HMAs, venetoclax in combination with either HMAs or low-dose cytarabine or investigational agents in the context of a Phase 1/2 clinical trial.

Our Clinical Data in AML CR1 and CR2 Patients

In an initial pilot clinical trial in AML, a total of nine adult patients of all ages with de novo AML were treated with upfront standard chemotherapy and were able to achieve CR1. Administration of GPS resulted in a median OS that was at least 35 months from the time of GPS administration. In this study, specifically for patients who were 60 years and older (n=5), median OS was at least 33 months from the time of GPS administration or approximately 43 months from the time of initial AML diagnosis. The mean time of follow-up was 30 months from the time of diagnosis at the time of this analysis for all patients. Of the eight patients tested for immunologic response, seven, or 87.5%, demonstrated a WT1-specific immune response.

In a subsequent Phase 2 clinical trial in AML, a total of 22 adult patients of all ages with de novo AML were treated with upfront standard chemotherapy and were able to achieve CR1. Most patients also received one to four cycles of "consolidation" chemotherapy per standard AML treatment guidelines. GPS was then administered within three months from the completion of the consolidation chemotherapy regimen in up to 12 total doses: six initial doses (priming immunization) followed by six additional "booster" immunizations over a total period of up to 15 months to qualifying patients (*i.e.*, patients who were clinically stable and did not show disease recurrence after the first six injections). This Phase 2 clinical trial met its primary endpoint of an actual OS rate of at least 34%, measured three years into the clinical trial (*i.e.*, percentage of patients alive after three years of follow-up). An actual OS rate of 47.4% was demonstrated at three years post-GPS treatment, exceeding historical published data of OS of 20% to 25% by 2.4- to 1.9-fold (or 240% to 190%), respectively.

GPS administration was also shown to improve OS in comparison to historical data in patients in CR1. Administration of GPS resulted in a median OS that was poised to exceed 67.6 months from the time of initial AML diagnosis in patients of all ages, which represents a substantial improvement compared to best standard therapy. Only five of the 22 patients underwent allo-HSCT and an ad hoc statistical analysis failed to show a significant effect of the transplant upon OS (either in median survival times or survival rates at specific landmark time-points). In this study, the patients' median age was 64 years old. Importantly, a preplanned subgroup analysis for the cohort of 13 patients within the clinical trial who were 60 years of age or older demonstrated a median OS of 35.3 months from time of initial diagnosis. Comparable historical populations have a median OS ranging from 9.5 to 16.8 months from initial diagnosis, which represents a 2.25 to 3.75-fold improvement in OS associated with GPS therapy in the CR1 maintenance setting as contrasted to these historical cohorts of broadly comparable patients.

The most frequent toxicities were mild to moderate local skin reactions and inflammation, as well as fatigue, which were self-limited and responded to local supportive measures and analgesics. None of the patients developed significant serious or high grade systemic adverse reactions (including anaphylaxis) attributable to GPS. GPS elicited WT1-specific immune responses in 88% of patients, including CD4 and CD8 T-cell responses. Further, the heteroclitic principle was confirmed, in that immune responses were seen against the native version of the two mutated WT1 peptides within the GPS mixture. The results showed a trend in improved clinical outcomes in patients who mounted an immune response with GPS compared to those patients who did not.

An additional Phase 2 clinical trial of GPS was performed at the H. Lee Moffitt Cancer Center & Research Institute, or Moffitt. This Phase 2 trial included 10 AML patients who had received first-line therapy for their disease, who then experienced relapse and were subsequently treated with second-line chemotherapy and achieved a CR2. This group of patients had a more advanced disease in comparison to those treated in the Phase 2 clinical trial in CR1 patients discussed above, and typically demonstrated a historical OS of less than ~8 months, even with post-CR2 allo-HSCT. In the Moffitt trial, the efficacy of GPS (measured as median OS, from the time of achievement of CR2 until death from any cause) was compared with that of "watchful waiting" in a cohort of 15 contemporaneously treated (but not matched by randomization) broadly comparable patients treated by the same clinical team at Moffitt. Initial data, at a median follow-up of 19.3 months, showed that GPS administration resulted in a median OS of 16.3 months (495 days) compared to 5.4 months (165 days) from the time of achievement of CR2. This was a statistically significant difference (p=0.0175). Two of 14 AML patients demonstrated relapse-free survival of more than one year. Both of these patients were in CR2 at time of GPS administration, with duration of their second remission exceeding duration of their CR1, strongly suggesting a potential benefit based on immune response mechanisms.

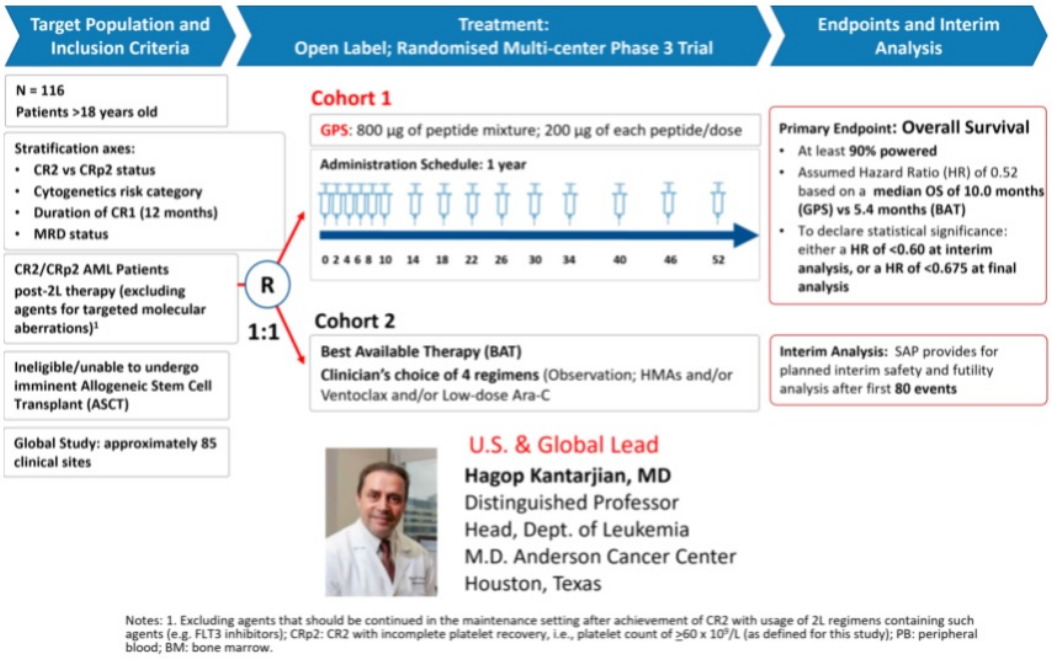
Final data, at a median follow-up of 30.8 months, showed a median OS of 21.0 months in patients receiving GPS therapy compared to 5.4 months in the AML CR2 patients treated with best standard care resulting in a statistically significant difference (p-value < 0.02). GPS was well-tolerated in this clinical trial.

Phase 3 REGAL Clinical Trial

Building on the Phase 2 study in AML CR2 patients, which showed a median OS of 21.0 months, at a median follow-up of 30.8 months, in patients receiving GPS compared to 5.4 months in contemporaneously treated patients with best standard therapy, in January 2020, we commenced a Phase 3 pivotal registration-enabling study for GPS in AML patients in CR2, including those in complete remission with incomplete platelet recovery. This study, which we refer to as the REGAL study, is a 1:1 randomized, open-label study comparing GPS in the maintenance setting to investigators' choice of best available treatment, or BAT, in adult AML patients (age >18 years) who have achieved their second hematologic (morphological) complete remission, with or without thrombocytopenia, after second-line antileukemic therapy and who are deemed ineligible for, or unable to undergo, allo-HSCT. The primary endpoint is OS and secondary endpoints include leukemia-free survival rates of achievement of MRD negativity, and antigen-specific T-cell immune response dynamics over time. We expect this study will be used as the basis for a BLA submission, subject to a statistically significant and clinically meaningful data outcome and agreement with the FDA.

The REGAL study is expected to enroll approximately 116 patients at up to approximately 85 clinical sites in the United States, Europe and Asia. The COVID-19 pandemic has impacted the timeline for the REGAL study over the past two years. Since we commenced the study in 2020, we have been initiating sites in the United States, Europe and, beginning in 2022, Asia. However, since the onset of the COVID-19 pandemic, we have observed that, at certain times and in certain instances, clinical site initiations, patient screening and patient enrollment have been delayed. These delays are likely due to many reasons, which have been changing and evolving as the COVID-19 pandemic itself has evolved, including the prioritization of hospital resources towards the care of patients with COVID-19, delays in reviews and approvals by independent institutional review boards, or IRBs, and/or ethics committees at clinical sites, the challenges for clinicians and patients to comply with clinical trial protocols due to quarantines impeding patient movement or interrupting operations at sites, restrictions on travel and, most recently, inadequate staffing at clinical sites, supply chain-related delays, and materials shortages. Throughout the United States, Europe and Asia, newly initiated sites have taken longer than expected to become fully operational and begin enrolling patients. We have taken several steps to mitigate these actual and potential delays, including increasing the number of clinical sites from 50 to up to approximately 85, increasing the number of additional countries, both in Europe and Asia, in which sites were or will be initiated, allocating additional resources, including additional CROs and internal personnel, to the REGAL study, and making certain changes to the protocol for the study. We are continuing to monitor each clinical site through our CROs as well as conducting direct outreach to investigators and study staff through site visits, investigator meetings and other modes of communication. Under our current planning assumptions, which take into account our best estimates of potential delays due to COVID-19, we believe that we will complete enrollment for the REGAL study in late 2022 or early in the first quarter of 2023. The protocol specifies that the study will have a planned interim safety and futility analysis after 80 events (deaths). In addition, the charter for the Independent Data Monitoring Committee, or IDMC, for the REGAL study provides that the IDMC will conduct safety and efficacy analyses at earlier points in the clinical trial. Based upon these current assumptions with respect to completion of enrollment and the estimated survival times for both the treated and control groups, we believe, after discussions with our external statisticians and experts, that the planned interim analysis after 80 events per the protocol will occur by the end of the first half of 2023, provided that our assumptions regarding the impact of COVID-19 on the operations of our clinical sites as well as the duration of the pandemic remain unchanged. Because this analysis is event driven, it may become available at different times than currently expected.

The key features and schema of this study are shown in the following graphic:



Expanded Access Program

At the request of several investigators, we are planning to institute an Expanded Access Program that would allow qualified physicians who desire to treat with AML patients who do not meet currently required study entry criteria for the ongoing REGAL trial with GPS. This access will be provided on a case by case basis to patients in the U.S. and, potentially, Germany. Patients treated under the Expanded Access Program will not be considered participants in the REGAL study. We expect the program to commence in the second quarter of 2022.

It is expected that the physician selected patients will be patients in CR1 who underwent a bone marrow transplant while being positive for the minimal residual disease (MRD+). The most common cause of early mortality in AML patients in CR1 is relapse. There is a high relapse rate among transplanted AML patients who enter a transplant in CR1, especially among those who are MRD+. Approximately 30% of those patients relapse within 6 months post-transplant, and approximately 35% within 8 months post-transplant, eventually reaching approximately 50% of patients by year 2 post-transplant.

At this time, there is no standard of care for maintenance after the transplant. Most antileukemic agents have a severe myelosuppressive effect and, as such, would be counter-productive in the post-transplant setting as they could delay engraftment resulting in both increased toxicity and lower efficacy (due to limiting graft versus leukemia effect). Attempts at maintenance with less myelosuppressive agents have a questionable track record. HMAs, the most studied class of drugs in this setting, have failed to show any benefit in a controlled clinical trial, while increasing toxicity. Molecularly targeted therapies (FLT3-ITD, IDH1m and IDH2m) appear to have more potential in the transplant setting but require the presence of targetable mutations. Therefore, a non-myelosuppressive immunotherapy that does not depend on targetable mutations may be an important advancement in an area of high unmet medical need.

In our Phase 2 study of GPS in AML CR1 patients, GPS has shown activity (as assessed by median leukemia free survival and median overall survival since the time of initial diagnosis versus historical controls) in these patients after standard induction chemotherapy, as well as one to four post-CR1 cycles of administration of further 'consolidation' chemotherapeutic regimen, after the completion of which they received GPS as 'maintenance'. We believe that there is theoretical rationale for cytocidal activity by CTLs after GPS therapy against leukemic stem cells as well, which are especially resistant to either chemotherapy or HMAs.

Phase 1 clinical trial of 3D189 in China

In January 2022, an IND application to initiate the first clinical trial in China for 3D189 (GPS) was accepted by China's National Medical Products Administration, or NMPA. The IND, for a small Phase I clinical trial investigating safety, was submitted by our partner in China, 3D Medicines Inc., or 3D Medicines. 3D Medicines expects to initiate this Phase 1 clinical trial by mid-2022 and will be responsible for all expenses related to executing the trial in China. On March 30, 2022, the IND was approved by the NMPA triggering a $1.0 million milestone payment to the Company which is expected to be received in the second quarter of 2022. The current clinical development plan provides for initiation of a Phase II clinical trial following receipt of satisfactory safety data from the Phase I study; the initiation of the Phase II study will also trigger a milestone payment to us which we expect to receive by the end of 2022.

Potential for GPS Monotherapy in Post-Transplant Patients

In June 2021, a peer-reviewed article was published in the journal, *Bone Marrow Transplantation*, which included a comprehensive retrospective analysis of survival outcomes in 4,280 AML patients treated in more than 450 blood and marrow transplant centers worldwide between 2007 and 2015. The analysis demonstrates the high unmet medical need to extend survival in AML patients. The published analysis shows that even among patients eligible to receive a bone marrow transplant, considered to be the only potential curative therapy in AML, less than half of the patients are alive five years after initial diagnosis. The analysis highlights the importance of the presence of MRD, with patients who harbored MRD at the time of transplant having only 34%-37% probability of surviving five years. In our completed Phase 2 study of AML CR1 patients, OS for patients treated with GPS was 48.5 months from the time of enrollment in the study (67.6 months from initial AML diagnosis). The retrospective analysis of the pooled outcomes for AML patients who underwent a transplant in the article published in Bone Marrow Transplantation indicates that the median OS from the time of transplant is approximately 26 months. We believe that there is strong scientific rationale for consideration of a study in the post-transplantation setting and we are exploring the feasibility of such a clinical trial.

GPS Combination Therapy with Checkpoint Inhibitors

Phase 1/2 Clinical Trial of GPS in Combination with Pembrolizumab

Given the potential immunobiologic and pharmacodynamic synergy between GPS and an immune check-point inhibitor (e.g., PD1 blocker), we entered into a Clinical Trial Collaboration and Supply Agreement with Merck (known as MSD outside the United States and Canada), to assess the efficacy and safety of GPS in combination with Merck's anti-PD-1 therapy pembrolizumab with exploratory long-term follow-up for OS and safety. In December 2018, we, in collaboration with Merck, initiated a Phase 1/2 open-label, non-comparative, multicenter, multi-arm clinical trial of GPS in combination with pembrolizumab in patients with WT1-positive advanced cancers, including both hematologic malignancies and solid tumors. The purpose of the study is to determine if the administration of GPS in combination with pembrolizumab has the potential to demonstrate clinical activity in the presence of macroscopic disease, where monotherapy with either agent would have a more limited effect. The negative influence of TME factors on the immune response is predicted to be mitigated by PD1 inhibition (by pembrolizumab), thus allowing the patients' own immune cells to invade and destroy cancerous growth deposits specifically sensitized against WT1 (by concomitantly-administered GPS). The endpoints of the study include safety, immunobiological response, overall response rate (as measured by "response evaluation criteria in solid tumors", or RECIST), progression free survival and overall survival and other analyses of interest. We, together with Merck, have determined to focus on 2nd or 3rd line WT1(+) relapsed or refractory ovarian metastatic cancer as the primary indication for the study.

Ovarian cancer represents an intriguing opportunity to study both the clinical and immunologic effects of GPS in this solid tumor. Additionally, therapeutic targeting of WT1 through immune pathways has largely not been pursued by others to date for this indication and ovarian cancer remains "incurable" once it advances and becomes disseminated, even in the face of significant advances in the field. Ovarian cancer was chosen as a target indication for the following reasons:

- ovarian cancer presents a clinical setting whereby MRD status can be achieved with standard upfront therapy both immediately after first line therapy, but also after effective debulking of the "first relapse." The latter subgroup of patients (after successful second line treatment/first salvage, lacking demonstrable macroscopic residual disease) would be optimal candidates for GPS therapy, as no standard maintenance therapy exists for such patients and the subsequent relapse patterns and metrics are known and predictable;
- the high levels of expression of WT1 in ovarian cancer cells. In fact, WT1 expression is so frequent that pathologists routinely use immunohistochemical stains for WT1 (with a standardized convention for describing expression and determining as "positive" or "negative") to help distinguish epithelial ovarian cancers from other tumors;
- preliminary evidence, in a previous study of GPS with nivolumab in ovarian cancer, that WT1 expression may be linked to prognosis in ovarian cancer and that it may play an anti-apoptotic role in ovarian cancer cell lines;
- the high degree of unmet medical need in ovarian cancer patients after first (or subsequent) successful "salvage" debulking therapy and the absence of effective therapies for such patients; and
- a predictive assumption of very low to negligible degree of clinical toxicity with a WT1-targeted immunotherapy such as GPS due to the fact that WT1 in normal, non-cancerous tissues is both expressed at extremely low levels and limited in number of organs and tissues, but also due to the fact that WT1 fragments, or peptide epitopes, in normal cells are presented to host APCs in a different manner than are WT1 fragments produced in cancer cells.

Epithelial cancer of the ovary, or ovarian cancer, is a relatively common gynecologic cancer that develops insidiously, and hence is associated with vague or no symptoms that would urge patients to seek medical attention. Not surprisingly, most women with ovarian cancer present with advanced (at least locally or regionally, and often systemically spread) disease. Ovarian cancer is managed with initial surgical resection followed by platinum-based chemotherapy. During the past decade, incremental advances in chemotherapy, and the introduction of targeted therapies (such as poly-ADP-ribose polymerase inhibitors and several others) and specially formulated compounds (such as liposomal anthracyclines) have resulted in improved survival and in more effective treatment of relapsed disease. In addition, a better understanding of genetic risk factors, along with aggressive screening, has permitted a tailored approach to preventive strategies, such as bilateral salpingo-oophorectomy in selected women along in specific patient populations genetically predisposed to this cancer (such as those harboring genetic alterations of the BRCA gene family). Although a complete clinical remission following initial chemotherapy can be anticipated for many patients, a review of “second-look” laparotomy, when it was often performed as a matter of routine care, indicates that less than 50% of patients are actually free of disease. Furthermore, nearly half of patients with a negative “second-look” procedure relapse and require additional treatment. Many patients will achieve a CR2 clinical response with additional chemotherapy. However, almost all patients will relapse after a short remission interval of nine to 11 months, with median overall survival of nine to 12 months. Effective strategies, such as introduction of novel immunotherapies, to prolong remission or to prevent relapse are required, as subsequent remissions are of progressively shorter duration until chemotherapy resistance broadly develops, leading to eventual disease-related demise.

In December 2020, we announced that the first set of evaluable patients (n = 8) in the study, diagnosed with metastatic ovarian cancer, demonstrated a disease control rate, or DCR, which is the sum of overall response rate and rate of stable disease, of 87.5% with a median follow-up of 9.4 weeks. At the first assessment time-point of 6 weeks post-therapy initiation, 100% of the patients were free of disease progression. Using a validated immunohistochemistry (IHC) assay during the screening period, the rate of WT1 positivity in this ovarian cancer patient population was approximately 70%. Six of the eight evaluable patients are continuing to receive GPS plus pembrolizumab.

In June 2021, we reported data and immune response profiles for 11 evaluable patients. The 11 patients had each received at least three GPS doses, the last of which was combined with pembrolizumab, and were evaluated for clinical responses; three of the 11 patients were also evaluated for immune responses. Of the 11 patients, 66.7% were refractory to or had failed their second-line therapies and 33.3% failed third-line or later therapy. All 11 patients were resistant to the standard of care platinum-based therapy. The DCR for the 11 patients was 63.6% at a median follow-up of 15.4 weeks, with median PFS at the time of follow-up analysis of 11.8 weeks. The landmark PFS rate by log-rank analysis at six months (26 weeks) was 33%. The rate of WT1 positivity, measured using the IHC assay, was 63.6%. The safety profile of the GPS-pembrolizumab combination was similar to that seen with pembrolizumab alone, with the addition of only low-grade, temporary local reactions at the GPS injection site, consistent with previously performed clinical studies with GPS. In addition, we also reported immunobiological data. CD8+ and CD4+ T-lymphocytes were isolated from peripheral blood mononuclear cells from three patients from whom samples had been collected both at baseline and at the time of the sixth GPS dose (i.e., 18 weeks after starting investigational therapy). The T-cells were assayed ex-vivo for immune responses against the pool of the four peptides that comprise GPS using the validated assay intracellular cytokine staining with fluorescence-activated single cell sorting (ICS-FACS) (Scorpion Biological Services, San Antonio, Texas), with appropriate positive and negative controls.

A total of five cytokine “channels” were used for the analysis (i.e., interferon-g, TNF-a, interleukin-2, CD107a and MIP-1b). The peptide re-challenge incubation period was seven days. At the 18-week time point versus pre-vaccination baseline, the assay demonstrated a relative increase in WT1-specific T-lymphocyte frequencies in peripheral blood averaging +242 percent (range: +104 to +385 percent across five cytokines) for CD8+ and +80.5 percent (range: +1 to +174 percent) for CD4+. There was also evidence of polyfunctional T-cell activation (increases in secretion of >2 cytokines) in two out of three patients (66 percent).

On February 1, 2022, we announced the completion of enrollment in the study. The total expected enrolled and evaluable number of patients is 17. Data from 15 patients is expected to be examined by mid-2022, with final data analysis for all evaluable patients expected by the end of 2022. We and Merck will jointly perform applicable analyses of the study, including survival, immune-biological and any other analyses of interest, to assess the safety and efficacy profile of the combination of GPS and pembrolizumab in this metastatic ovarian cancer indication.

GPS Combination Therapy with Nivolumab for MPM

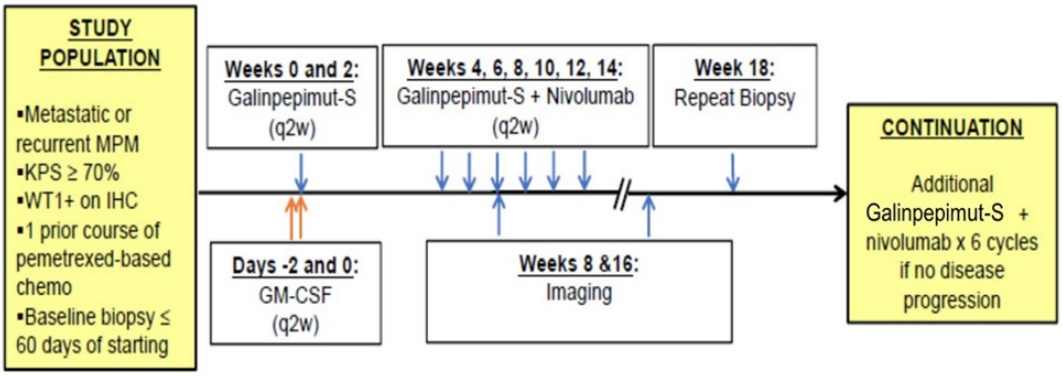
A single-center, open-label, single-arm, non-randomized investigator-sponsored Phase 1 trial of concomitant administration of GPS in combination with Bristol-Myers Squibb's anti-PD-1 therapy, nivolumab (Opdivo®) was initiated in February 2020 at MSK in patients with MPM who have previously received treatment with pemetrexed-based chemotherapy and have measurable disease on imaging, either due to residual disease after prior treatment or recurrent disease. We are providing GPS and BMS is providing nivolumab for this study.

The principal investigator for the study is Dr. Marjorie G. Zauderer, MD, Co-Director, Mesothelioma Program and Associate Attending Physician in the Thoracic Oncology Service, Department of Medicine at MSK. The IST is planned to accrue a minimum of 10 patients. The purpose of the trial is to determine if the administration of GPS in combination with nivolumab has the potential to demonstrate antitumor immune responses and meaningful clinical activity in the presence of macroscopic disease in MPM patients. The study will also investigate the tolerability of the combination, evaluate the immunogenicity of the two agents administered together, by CD4+ and CD8+ T-lymphocytes (both peripherally and at the tumor site), and gauge the degree of clinical benefit by assessment of the overall response rate with the combination in comparison with that reported with nivolumab alone in historical comparable patient populations.

With approximately 3,300 cases in the United States each year, accompanied by a rising incidence in developing countries, MPM is notoriously difficult to treat and can lead to poor clinical outcomes with respect to both overall survival and progression-free survival, especially for those patients with the sarcomatoid variant who show a median overall survival of approximately 4.0 to 5.0 months. In relapsed and refractory patients who progressed after the first line standard of care pemetrexed, a similar patient population to that in the GPS nivolumab combination trial, the common treatment regimen is vinorelbine and overall survival in those patients is reported to be between 4.5 and 6.2 months. In patients treated with other chemotherapy regimens, such as carboplatin and irinotecan, median overall survival is reported to be approximately 7.0 months.

In a randomized, controlled, blinded Phase 2 clinical trial in MPM patients completed in 2017, GPS monotherapy given as maintenance after first line tumor-debulking multimodality treatment demonstrated meaningful clinical activity with median survival of 22.8 months vs. 18.3 months in the control group (N=41) and with associated sustained immune responses (both CD4+ and CD8+) against the WT1 antigen while adverse events were mainly comprised of low grade reactions at the site of the injection. See *GPS Monotherapy: Completed Clinical Trials in Other Indications.*

The key features and schema of the study are shown in the Figure below:



In December 2020, we announced that the first set of evaluable patients (n = 3) had a median PFS of at least 10 weeks since therapy initiation. In primary refractory MPM patients, any prolongation of progression-free interval greater than 8 weeks would be considered clinically meaningful, considering the current lack of effective therapies. All patients had the epithelioid variant of MPM, a tumor which is universally expressing WT1. GPS was found to be appropriately immunogenic, leading to the emergence of antigen (WT1)-specific CD4+ T-memory cell responses at three months post-therapy initiation. In June 2021, we reported updated clinical data for four evaluable patients, all of whom had the MPM epithelioid and/or sarcomatoid variant and all of whom had received and progressed with, or are refractory to, frontline pemetrexed-based chemotherapy. Average overall survival (OS) was 35.3 + 24.0 weeks with a median OS of 35.4 weeks, while average progression-free survival (PFS) was 8.8 + 4.2 weeks with a median PFS of seven weeks, both at a median follow-up of 35.4 weeks. The safety profile of the GPS-nivolumab combination was similar to that seen with nivolumab alone, with the addition of only low-grade, temporary local reactions at the GPS injection site, consistent with previously performed clinical studies with GPS.

Additional MPM patients are currently being enrolled; completion of study enrollment (target total n = 10) is expected during the second half of 2022. We expect to report additional clinical and immune response data in the first half of 2022, including, potentially, an assessment of CD8+ and CD4+ T-cell responses to the WT1 peptide pool in the GPS mixture, as well as epitope spreading (ES) by testing for antibody presence (IgG's) directed specifically against the full-length WT1 protein (intra-antigenic ES) and IgG's presence against other key oncofetal antigens expressed in MPM (inter-antigenic epitope spreading).

GPS Monotherapy: Completed Clinical Trials in Other Indications

MPM

MPM is an asbestos-related cancer that forms on the protective tissues that cover many of the internal organs. The most common area affected is the lining of the lungs and abdomen, though it can also form around the lining of the heart. Most cases are traced to job-related exposures to asbestos and it can take approximately 40 years between exposure and cancer formation. Symptoms may include shortness of breath, a swollen abdomen, chest wall pain, cough, feeling tired, and weight loss. MPM is generally resistant to radiation and chemotherapy, and long-term survival is rare, even in cases where aggressive upfront debulking multimodality therapy (*i.e.*, extirpative surgery, chemotherapy and in some cases radiotherapy, often described as "trimodality therapy" when used to treat MPM) are used.

A randomized, double-blind, placebo-controlled Phase 2 clinical trial in MPM patients enrolled a total of 41 patients at MSK and MDACC. Data from this Phase 2 clinical trial was presented in 2016. Based on an initial analysis of 40 patients who were eligible at the time with a median follow-up of 16.3 months, a median OS of 24.8 months was seen for GPS-treated MPM patients, compared to a median OS of 16.6 months for patients in the control arm. For patients with a basic reproductive ratio tumor resection and subsequent treatment with GPS, a significant survival benefit was observed compared to those who received a placebo, with a median OS of 39.3 months compared to 24.8 months (HR: 0.415) in favor of GPS. In a subsequent analysis for the entire cohort (n=41) in August 2016, with a median follow-up of 17.2 months, a median OS of 22.8 months was observed for GPS-treated MPM patients, compared to a median OS of 18.3 months for patients in the control arm. In the datasets from both of these analyses, GPS was shown to induce WT1-specific CD8 and CD4 T-cell activation. There were no clinically significant severe adverse events in this study.

Multiple Myeloma (MM)

MM is a cancer formed by malignant plasma cells, and its cause is unknown. The overgrowth of plasma cells in the bone marrow crowds out normal blood-forming cells, causing low blood counts and anemia (a shortage of red blood cells). MM can also cause a shortage of platelets (cells responsible for normal blood clotting) and lead to increased bleeding and bruising, along with problems fighting infections due to low white cell counts and/or lower levels of infection-fighting antibodies. MM causes a host of organ problems and symptoms, including fatigue, bone pain, fractures, circulatory problems (in small vessels of the brain, eye retina, heart, bowel, etc.) and kidney failure. Treatment for MM includes chemotherapy, glucocorticoids, drugs that modulate the immune system (immunomodulatory drugs, or IMiDs), proteasome inhibitors, histone deaceylase inhibitors, targeted monoclonal antibodies, radiation and autologous stem cell transplants, or ASCTs. The prognosis in MM is highly variable and depends on numerous risk factors, some related to the biology of the disease, others to the host (*e.g.*, age and functional status). Consequently, median survival can vary from up to at least 15 years in non-high-risk patients who achieve complete remission, as defined by the International Myeloma Working Group, or IMWG, criteria, to approximately three years (from time of initial treatment) in patients with MM who achieve less than partial response, or PR, after ASCT. There are patients with MM who fare even more poorly than described above. For example, those in the immediately aforementioned group who also have high-risk cytogenetics at baseline may survive on average less than three years. Similarly, patients who are ineligible for ASCT and are managed only with chemotherapy and long-term IMiD maintenance (with up to nine cycles of lenalidomide) who also achieve less than complete remission and remain MRD-positive demonstrate a three-year OS rate of only about 55%; these landmark three-year OS rates decrease by approximately 40 to 50% in patients who also have high-risk cytogenetics at baseline. Despite significant therapeutic advances in the management of MM, the prognosis of patients with high-risk cytogenetics at the time of diagnosis remains quite poor, even when they successfully complete an ASCT, particularly if such patients continue to have evidence of MRD.

We have reported comprehensive final data from a Phase 2 study for GPS in 19 patients with MM. All non-progression events were confirmed and remained ongoing as of the time of the latest presentation (median follow-up at 20 months for survivors). The data indicate promising clinical activity among MM patients with high-risk cytogenetics at initial diagnosis who also remain MRD(+) after successful frontline therapy (induction regimen followed by ASCT). This subgroup of MM patients, when serially assessed per IMWG criteria, typically relapse/progress within 12 to 14 months after ASCT, even when they receive maintenance therapy with IMiDs such as

thalidomide or proteasome inhibitors such as bortezomib - 18 of the 19 patients received lenalidomide maintenance starting after the first three GPS administrations following ASCT; the remaining single patient received bortezomib under the same schedule. All patients had evidence of at least MRD (MRD+) after ASCT, while 15 of the 19 also had high-risk cytogenetics at diagnosis. Combined, these characteristics typically result in low PFS rates that do not exceed 12 to 14 months following ASCT, even while on maintenance therapy with IMiDs or proteasome inhibitors, which are the current standards of care. At June 2017, median PFS with GPS was 23.6 months, while median OS had not been reached. Our results compare favorably with an unmatched cohort of broadly comparable MM patients with high-risk cytogenetics published by the Spanish PETHEMA group from the PETHEMA Network No. 2005-001110-41 trial. Our GPS therapy demonstrated a 1.87-fold increase in median PFS, as well as a 1.34-fold increase in the PFS rate at 18 months compared to the aforementioned historical cohort, which included MM patients with high-risk cytogenetics and MRD(+) post-ASCT and on continuous intensive maintenance with thalidomide +/- bortezomib. The safety profile was devoid of grade 3/4/5 treatment-related adverse events. Immune response data showed that up to 91% of patients had successfully developed T-cell (CD8 or CD4) reactivity to any of the four peptides within the GPS mixture, while up to 64% of patients demonstrated immune response positivity (CD4/CD8) against more than one WT1 peptide (multivalent responses). Moreover, multifunctional cross-epitope T-cell reactivity was observed in 75% of patients to antigenic epitopes against which hosts were not specifically immunized, in a pattern akin to epitope spreading. Further, a distinctive link was shown between the evolution of immune responses and changes in clinical response status (achievement of CR/very good partial response clinical status per IMWG criteria) over time following treatment with GPS, with each patient being used as his or her own control for each longitudinal comparison. This association has not been previously described for a peptide vaccine in MM. We believe that these results offer mechanistic underpinnings for immune activation against WT1 in patients with aggressive, high-risk MM, and support the potential antimyeloma activity of GPS.

GPS Combination Therapy: Completed Clinical Trial in Ovarian Cancer

GPS was studied in combination with nivolumab in an open-label, non-randomized Phase 1/pilot clinical trial, which was independently sponsored by MSK. The aim of the study was to evaluate the safety and efficacy of this combination in patients with WT1-expressing (WT1+) recurrent ovarian, fallopian tube or primary peritoneal cancer who were in second or greater clinical remission (after their successful first or subsequent "salvage" therapy). Eligible patients were devoid of macroscopic residual or recurrent disease, i.e., were free of locally or distantly metastatic deposits detectable by imaging modalities (CT, MRI and/or PET scan). This Phase 1/pilot clinical trial enrolled 11 patients with recurrent ovarian cancer who were in second or greater clinical remission at MSK, of whom 10 were evaluable. Patients enrolled in the clinical trial received the combination therapy during the clinical trial's 14-week treatment period. Individuals who had not progressed by the end of this period also received a maintenance course of GPS. In this study, treatment was continued until disease progression or toxicity. Information on the primary endpoint of this clinical trial, which was the safety of repeated GPS administrations, for a total of six doses, in combination with seven infusions of nivolumab was presented at the American Society of Clinical Oncology, or ASCO, 2018 annual meeting (O'Cearbhaill RE, et al). The secondary endpoint of the study was immune response, and the exploratory endpoints included landmark one-year PFS rate compared to historical controls and correlative analyses between clinical and immune responses. Exploratory efficacy interim data from this pilot trial showed that GPS, when combined with a PD-1 inhibitor, in this case nivolumab, demonstrated PFS of 64% at one year in an intent to treat the group of 11 evaluable patients with WT1+ ovarian cancer in second or greater remission. Among patients who received at least three doses of GPS in combination with nivolumab, PFS at one year was 70% (7/10). The historical rates with best standard treatment do not exceed 50% in this disease setting. The most common adverse events were Grade 1 or 2, including fatigue and injection site reactions. Dose limiting toxicity was observed in one patient, following the second dose of the combination. No additional adverse event burden was observed for the combination as compared to nivolumab monotherapy. The combination induced a high frequency of T- and B-cell immune responses.

Follow-up data now show that three of the 11 patients enrolled in the study have continued to show no signs of disease progression. The mean PFS for these three patients is 35.4 months from the initiation of salvage chemotherapy, or mean PFS of 30.1 months from the first administration of GPS plus nivolumab. Based on this follow-up information, the estimated two-year PFS rate for this study is now 27.3% for the intent-to-treat, or ITT, patients (n=11) and approximately 30% for patients who received greater than two doses of GPS and nivolumab (n=10), as compared to a historical 3% to 10% PFS rate for patients receiving only salvage chemotherapy. No new serious adverse events were noted during the longer follow-up period.

GPS Regulatory and Manufacturing

We have received approvals from the regulatory authorities in the United States, France, Germany, Greece, Poland, Hungary and Taiwan to commence enrollment in our Phase 3 REGAL study in those countries. We expect to obtain regulatory approvals from additional countries in the first half of 2022.

In August 2021, we manufactured the second of three registration batches of GPS which will be required for a BLA for GPS assuming positive data from the REGAL study. This additional batch will be used in our GPS clinical programs and for clinical supply to 3D Medicines under the license agreement for development and, potentially, commercialization in Greater China.

During the first half of 2021, the drug product manufacturing process for GPS was successfully transferred to a new CMO, Lyophilization Services of New England, Inc., or LSNE. LSNE manufactured a new regulatory standard drug product batch which entailed further process improvements which were agreed upon by the FDA. The new manufacturing batch met all the release criteria and, to date, has shown favorable stability data on already known long-term conditions (-20°C) as well as newly accelerated conditions (5°C and 25°C). Both long-term and accelerated stability data are monitored to confirm that all drug product parameters are within the acceptance criteria and this optimized batch, based on the data to date, may ultimately allow for GPS to be stored in 5°C to 25°C conditions versus -20°C. This favorable outcome would be more optimal for supply chain and logistical reasons.

Commercial Strategy for GPS

In December 2020, we entered into an exclusive license agreement with 3D Medicines Inc., a China-based biopharmaceutical company developing next-generation immuno-oncology drugs, for the development and commercialization of GPS, as well as the Company's next generation heptavalent immunotherapeutic GPS+, which is at preclinical stage, across all therapeutic and diagnostic uses in the Greater China territory (mainland China, Hong Kong, Macau and Taiwan). We have retained sole rights to GPS and GPS+ outside of the Greater China area. See "Strategic Collaborations and License Agreements."

Nelipepimut-S

Our other cancer immunotherapy product, NPS, targets HER2 expressing cancers. The historical development program for NPS has primarily targeted patients in the adjuvant, or after-surgery, setting who have relatively healthy immune systems but may still have residual disease.

NPS is the immunodominant nonapeptide derived from the extracellular domain of the HER2 protein, a well-established and validated target for therapeutic intervention in breast and gastric carcinomas. The NPS vaccine is combined with GM-CSF (Sargramostim) for injection in between the layers of the skin epidermis, i.e., intradermal administration. Data has shown that an increased presence of circulating tumor cells, or CTCs, may predict reduced DFS, and OS, suggesting a presence of isolated micrometastases, not detectable clinically, but, over time, can lead to recurrence of cancer, most often in distant sites. After binding to the specific HLA molecules on antigen presenting cells, the NPS sequence stimulates specific CTLs, causing significant clonal expansion. These activated CTLs recognize, neutralize and destroy, through cell lysis, HER2 expressing cancer cells, including occult cancer cells and micrometastatic foci. This immune response can also generate CTLs to other immunogenic peptides through inter- and intra-antigenic epitope spreading.

We have previously reported data for NPS in two different types of breast cancer:

- In 2018 and 2019, we announced positive data for a subset of patients with TNBC from the prospective, randomized, single-blinded, controlled Phase 2b IST clinical trial of trastuzumab +/- NPS in HER2 1+/2+ breast cancer patients in the adjuvant setting to prevent recurrences showing a clinically and statistically significant improvement in the DFS rate for the TNBC cohort at 24 months of 92.6% for patients treated with NPS plus trastuzumab compared to 70.2% for those treated with trastuzumab alone. In early 2020, based upon FDA feedback and on the totality of clinical, safety and translational NPS data to date, we finalized the design and plan for a Phase 3 registration-enabling study of NPS in combination with trastuzumab for the treatment of patients with TNBC in the adjuvant setting after standard treatment.
- In March 2020, we reported preliminary antigen-specific immune response data from a Phase 2 IST of NPS in combination with GM-CSF which evaluated women diagnosed with, ductal carcinoma in situ of the breast, or DCIS, who are HLA-A2+ or A3+ positive, who express HER2 at IHC 1+, 2+, or 3+ levels, and who are pre- or post-menopausal. The trial had an immunological (rather than clinical) endpoint evaluating NPS peptide-specific CTL (CTL; CD8+ T-cell) response in vaccinated patients. The relative frequency of NPS-specific CD8 CTLs as a percentage (NPS-CTL%) was twice as large in the NPS-treated patients. The mean difference in NPS-CTL% increase between the active and control groups was +0.10% vs +0.05%. The relative magnitude of change in NPS-CTL% mean values in NPS-treated patients over time was an 11-fold increase, from 0.01% at baseline to 0.11% after surgery, indicating a continued antigen-specific T-cell response post-NPS vaccination. The overall adverse event profile was consistent with previous safety data.

Since 2018, we have conducted an extensive global out-licensing effort for NPS to find an interested party to fund and conduct the future clinical development of NPS in order to maximize the potential of the program, with a focus on further development of NPS for breast cancer, specifically TNBC. We do not currently plan to conduct and fund a Phase 3 program for NPS for the TNBC indication on our own. As part of our out-licensing efforts, we engaged numerous outside advisors who assisted us in specifically targeting over 100 pharmaceutical and biotechnology companies in the United States, Europe and Asia with research and development programs in breast cancer as well as those companies developing biosimilars of trastuzumab and companies developing immunotherapies. During this period through the end of 2021, we met with several companies who engaged in varying degrees of due diligence and negotiation, but we were ultimately unable to agree upon terms favorable to the Company which we believed were commensurate with the value of NPS. We believe that the reason for our inability to agree upon terms which we believe are commensurate with the value of the asset was due to the changing market for breast cancer therapies, the scope, cost and timeline for a Phase 3 trial which would satisfy regulatory requirements for the TNBC indication and the failure, in 2016, of the Phase 3 clinical trial of monotherapy NPS in breast cancer. At this point in time, we have concluded that continued efforts to outlicense NPS for further development for breast cancer are unlikely to result in a licensing transaction. As we continue our out-licensing strategy, we are now focusing on the potential for NPS in other cancer indications.

Strategic Collaborations and License Agreements

Exclusive License Agreement-Memorial Sloan Kettering Cancer Center

In September 2014, we entered into a license agreement with MSK under which we were granted an exclusive license to develop and commercialize MSK's WT1 peptide vaccine technology. The MSK original license agreement was first amended in October 2015, further amended in August 2016, amended and restated in May 2017 and again amended and restated in October 2017. In connection with the entry of the original license agreement and its amendments, MSK was issued or assigned an aggregate of 4,846 ordinary shares of Private SELLAS common stock for the year ended December 31, 2017. These common stock shares were converted into our common stock shares upon the Merger.

Under the terms of the current amended and restated MSK license agreement, we agreed to pay minimum royalty payments in the amount of $0.1 million each year commencing in 2015 and research funding costs of $0.2 million in each year and for three years commencing in January 2016. We also agreed to pay MSK a mid-six digit amount over a one year period in exchange for MSK's agreement to further amend and restate the MSK license agreement in October 2017. In addition, to the extent certain development and commercial milestones are achieved, we also agreed to pay MSK up to $17.4 million in aggregate milestone payments for each licensed product, and for each additional patent licensed product, up to $2.8 million in additional milestone payments. We also agreed to pay MSK a tiered royalty in the mid-single digits in the event of commercial sales of any licensed products and agreed to raise $25.0 million in gross proceeds no later than December 31, 2018. We raised this amount from the proceeds received from the sale of our Series A Convertible Preferred stock in March 2018 and our underwritten public offering of shares of common stock, pre-funded warrants to purchase shares of common-stock, and warrants to purchase shares of common stock in July 2018. Under the terms of the agreement, we achieved a clinical development milestone at the end of the fourth quarter of 2018, triggering a $0.5 million payment in the first quarter of 2019.

Unless terminated earlier in accordance with its terms, the MSK license agreement as amended and restated, will continue on a country-by-country and licensed product-by-licensed product basis, until the later, of: (a) expiration of the last valid claim embracing such licensed product; (b) expiration of any market exclusivity period granted by law with respect to such licensed product; or (c) ten years from the first commercial sale in such country.

Merck & Co., Inc. Clinical Trial Collaboration and Supply Agreement

In September 2017, we entered into a clinical trial collaboration and supply agreement through a Merck subsidiary, whereby we agreed with the Merck subsidiary to collaborate on a clinical program to evaluate GPS as it is administered in combination with their PD1 blocker pembrolizumab in a Phase 1/2 clinical trial enrolling patients in up to five cancer indications, including both hematologic malignancies and solid tumors.

The Phase 1/2 clinical trial was designed to explore the combination of GPS plus pembrolizumab in patients with WT1+ relapsed or refractory tumors in both solid tumor and hematological cancer indications and to assess the efficacy and safety of the combination, comparing overall response rates and immune response markers achieved with the combination compared to prespecified rates based on those seen with pembrolizumab alone in comparable patient populations. This trial was initiated in December 2018. In 2020, we, together with Merck determined to focus on ovarian cancer (second or third line). We reported updated clinical and initial immune response data from this study in June 2021. In February 2022 we reported that we had completed enrollment of 17 evaluable patients in this study. Data from 15 of the 17 evaluable patients is expected to be examined by mid-2022, with final data analysis for all evaluable patients expected by the end of 2022.

Exclusive License Agreement with 3D Medicines Inc.

In December 2020, we, together with our wholly-owned subsidiary, SLSG Limited, LLC, entered into an Exclusive License Agreement (the "3DMed License Agreement") with 3D Medicines Inc., or 3DMed, pursuant to which we granted 3D Med a sublicensable, royalty-bearing license, under certain intellectual property owned or controlled by us, to develop, manufacture and have manufactured, and commercialize GPS and heptavalent GPS, or GPS-Plus, product candidates, or the Licensed Products, for all therapeutic and other diagnostic uses in mainland China, Hong Kong, Macau and Taiwan, or the 3DMed Territory. The license is exclusive, except with respect to certain know-how that has been non-exclusively licensed to us and is sublicensed to 3DMed on a non-exclusive basis. We have retained development, manufacturing and commercialization rights with respect to the Licensed Products in the rest of the world.

In partial consideration for the rights granted by us, 3DMed agreed to pay us (i) a one-time upfront cash payment of $7.5 million in order to reimburse us for certain expenses incurred with respect to the development of the Licensed Products prior to execution of the License Agreement, and (ii) milestone payments totaling up to $194.5 million in the aggregate upon the achievement of certain technology transfer, development and regulatory milestones, as well as certain net sales thresholds of Licensed Products in the 3DMed Territory in a given calendar year.

3DMed also agreed to pay tiered royalties based upon a percentage of annual net sales of Licensed Products in the 3DMed Territory ranging from the high single digits to the low double digits. The royalties are payable on a Licensed Product-by-Licensed Product and region-by-region basis commencing on the first commercial sale of a Licensed Product in a region and continuing until the latest of (i) the date that is fifteen years from the receipt of marketing authorization for such Licensed Product in such region and (ii) the date that is ten years from the expiration of the last valid claim of a licensed patent covering or claiming such Licensed Product in such region. The royalty rate is subject to reduction under certain circumstances, including when generic competition for a Licensed Product exists in a particular region.

3DMed is responsible for all costs related to developing, obtaining regulatory approval of and commercializing the Licensed Products in the 3DMed Territory. 3DMed is required to use commercially reasonable best efforts to develop and obtain regulatory approval for, and upon receipt of regulatory approval, commercialize the Licensed Products in the 3DMed Territory. A joint development committee has been established between 3DMed and us to coordinate and review the development, manufacturing and commercialization plans with respect to the Licensed Products in the 3DMed Territory. We and 3DMed also agreed to negotiate in good faith the terms and conditions of a clinical supply agreement, a commercial supply agreement, and related quality agreements pursuant to which we will manufacture or have manufactured and supply 3DMed with all quantities of the Licensed Product necessary for 3DMed to develop and commercialize the Licensed Products in the 3DMed Territory until 3DMed has received all approvals required for 3DMed or its designated contract manufacturing organization to manufacture the Licensed Products in the 3DMed Territory.

The 3DMed License Agreement will expire on a Licensed Product-by-Licensed Product and region-by-region basis on the date of the expiration of all of 3DMed's payment obligations to us. Upon expiration of the 3DMed License Agreement, the license granted to 3DMed will become fully paid-up, perpetual and irrevocable. Either party may terminate the 3DMed License Agreement for the other party's material breach following a cure period or upon certain insolvency events. We may terminate the 3DMed License Agreement if 3DMed or its affiliates or sublicensees challenge the validity or enforceability of the licensed patents. At any time following the two-year anniversary of the effective date, 3DMed has the right to terminate the 3DMed License Agreement for convenience, subject to certain requirements. 3DMed may terminate the 3DMed License Agreement upon prior notice to us if the grant of the license to 3DMed is prohibited or delayed for a period of time due to a change of United States export laws and regulations.

The 3DMed License Agreement includes customary representations and warranties, covenants and indemnification obligations for a transaction of this nature.

Under the 3DMed License Agreement, we achieved regulatory milestones relating to agreement upon and completion of a technology transfer plan in March 2021 and June 2021, respectively, for $1 million each.

In January 2022, we announced that an IND application filed by 3D Medicines to initiate the first clinical trial in China for 3D189, also known as GPS, has been accepted by China's National Medical Products Administration ("NMPA"). On March 30, 2022, the IND was approved by the NMPA triggering a $1.0 million milestone payment to the Company which is expected to be received in the second quarter of 2022. The IND is for a small Phase I clinical trial investigating safety.

The University of Texas M. D. Anderson Cancer Center and The Henry M. Jackson Foundation for the Advancement of Military Medicine, Inc. License Agreement

In September 2006, we acquired rights and assumed obligations under a license agreement among Apthera, Inc., our wholly owned subsidiary, the University of Texas M.D. Anderson Cancer Center, or MDACC, and the Henry M. Jackson Foundation for the Advancement of Military Medicine, Inc., or HJF, which grants exclusive worldwide rights to a U.S. patent covering the nelipepimut-S peptide and several U.S. and foreign patents and patent applications covering methods of using the peptide as a vaccine. Under the license agreement we agreed to pay MDACC and HJF up to $3.8 million in aggregate milestone payments to the extent certain development and commercial milestones are reached and a $0.2 million annual maintenance fee. We also agreed to pay MDACC and HJF a tiered royalty in the mid-single digits in the event of any commercial sales of licensed products.

Manufacturing

We do not own or operate manufacturing facilities for the production of our product candidates, nor do we have plans to develop our own manufacturing operations in the foreseeable future. We currently depend on third-party contract manufacturers for all of our required raw materials, active pharmaceutical ingredients, and finished product candidate for our clinical trials. We do not have any current contractual arrangements for the manufacture of commercial supplies of any product candidates. We currently employ internal resources and third-party consultants to manage our manufacturing contractors.

Sales and Marketing

We have not yet defined our sales, marketing or product distribution strategy for our product candidates or any future product candidates. Our commercial strategy may include the use of strategic partners, distributors, a contract sale force, or the establishment of our own commercial and specialty sales force, as well as similar strategies for regions and territories outside the United States. We plan to further evaluate these alternatives as we approach approval for the use of our product candidates for one or more indications.

Intellectual Property

Our commercial success depends in part on our ability to avoid infringing the proprietary rights of third parties, our ability to obtain and maintain proprietary protection for our product candidates, technologies and know-how, and our ability to prevent others from infringing our proprietary rights. We seek to protect our proprietary position by, among other methods, evaluating relevant patents, establishing defensive positions, monitoring European Union oppositions and pending intellectual property rights, preparing litigation strategies in view of the U.S. legislative framework, filing U.S. and international patent applications on technologies, inventions and improvements that are important to our business and maintaining our issued patents. We also include restrictions regarding use and disclosure of our proprietary information in our contracts with third parties, and utilize customary confidentiality and invention assignment agreements with our employees, consultants, clinical investigators and scientific advisors to protect our confidential information and know-how. Together with our licensors, we also rely on trade secrets to protect our combined technology especially where we do not believe patent protection is appropriate or obtainable. It is our policy to operate without knowingly infringing on, or misappropriating, the proprietary rights of others.

The term of individual patents depends upon the legal term of the patents in countries in which they are obtained. In most countries, including the United States, the patent term is generally 20 years from the earliest date of filing a non-provisional patent application in the applicable country. In the United States, a patent's term may, in certain cases, be lengthened by patent term adjustment, which compensates a patentee for administrative delays by the U.S. Patent and Trademark Office in examining and granting a patent or may be shortened if a patent is terminally disclaimed over a commonly owned patent or a patent naming a common inventor and having an earlier expiration date.

The patent term of a patent that covers an FDA-approved drug may also be eligible for patent term extension, which permits patent term restoration as compensation for the patent term lost during the FDA regulatory review process. The Drug Price Competition and Patent Term Restoration Act of 1984, or 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. 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. Similar provisions are available in the European Union and certain other foreign jurisdictions to extend the term of a patent that covers an approved drug. In the future, if and when our product candidates receive approval by the FDA or foreign regulatory authorities, we expect to apply for patent term extensions on issued patents covering those products, depending upon the length of the clinical trials for each drug and other factors.

Our patent portfolio includes the following:

Patents and patent applications covering GPS and WT1-targeting peptides:

- Patent application co-owned by us and MSK:
    - Applications in the United States, Australia, Canada, China, Europe, Israel, India, Japan, South Korea, Mexico and Russia covering a heptavalent (7-peptide) immunotherapy composition and methods of use for treating, reducing the incidence of, or inducing an immune response against a WT1-expressing cancer, which are pending and, if granted, are expected to expire in 2040.
- Patents and patent applications in-licensed from MSK:
    - Composition-of-matter patents covering the WT1-A1 peptide of GPS which have issued in the United States, Canada, Australia, and several countries of the European Union, and which are expected to expire in the United States in 2026 and elsewhere in 2024;
    - Composition-of-matter patents covering the WT1-427 long and WT1-331 long peptides of GPS issued in the United States, which is expected to expire in 2031, and patents covering the methods of use in the United States, and which are expected to expire in 2026; and a patent application covering peptide conjugates of the WT1-427 long peptide or WT1-331 long peptide, and which, if granted, is expected to expire in 2026;

- Composition-of-matter patents covering the WT1-427 long peptide of GPS and WT1-331 long peptide of GPS, and methods of use, which have issued in Australia and several countries of the European Union, and which are expected to expire in 2026;
- Composition-of-matter patent covering the WT1-427 long peptide of GPS and method of use, which has issued in Canada, and which is expected to expire in 2026, and composition of matter patent application covering the WT1-331 long peptide of GPS and method of use, which is pending in Canada and which, if granted, is expected to expire in 2026;
- Composition-of-matter patent covering a WT1-specific peptide issued in the United States, which is expected to expire in 2026;
- Composition-of-matter patent covering the WT1-122A1 long peptide of GPS in the United States which is expected to expire in 2033; and patent application covering the WT1-122A1 long peptide of GPS and methods of use in the United States, and which if granted, is expected to expire in 2027;
- Composition-of-matter patent covering the WT1-122A1 long peptide of GPS and methods of use in several countries of the European Union, which is expected to expire in 2027, and patent applications covering the WT1-122A1 long peptide of GPS and methods of use pending in the European Union and Canada, and which if granted, are expected to expire in 2027;
- Composition-of-matter patents covering certain WT1-targeting peptides and methods of use in the United States, Australia, China, several countries of the European Union, and Japan, which are expected to expire in 2034, and patent applications covering certain WT1-targeting peptides and methods of use pending in the United States, Australia, European Union, Canada, China, Hong Kong, and Japan, and which, if granted, are expected to expire in 2034;
- Patents covering methods for treating, reducing the incidence of, or inducing an immune response against a WT1-expressing cancer, using the peptides of GPS in combination with anti-PD-1 antibody checkpoint inhibitors in the United States and Japan, and which are expected to expire in 2037 and 2036, respectively; and
- Patent applications covering methods for treating, reducing the incidence of, or inducing an immune response against a WT1-expressing cancer, using the peptides of GPS in combination with immune checkpoint inhibitors in the United States, Australia, Canada, China, Hong Kong, European Union, South Korea, and Japan, and which if granted, are expected to expire in 2036.

Patents and patent applications covering NPS:

- Patent applications owned by us:
  - Patent applications in the United States, Australia, Canada, China, Europe, Israel, South Korea, Mexico and Russia covering treatment of TNBC using a combination of NPS and trastuzumab, and which, if granted, are expected to expire in 2039.
- Patents and patent applications in-licensed from HJF:
  - Composition-of-matter patent covering modified NPS peptides, and method patent covering method of their production, and which issued in the United States which are expected to expire in 2025 and 2024, respectively; and patent application pending in the United States covering modified NPS peptides and methods of use, and which, if granted, is expected to expire in 2023;
  - Patents covering treatment of cancer expressing HER2/neu using a combination of NPS and trastuzumab, which have issued in the United States and Australia, and which are expected to expire in 2026; and

- Patents covering a method of inducing protective or therapeutic immunity against breast cancer having low/intermediate HER2 expression, which have issued in the United States, Australia, Canada, certain countries in the European Union, Japan, South Korea, and Mexico, and which are expected to expire in 2028; and patent applications covering a method of inducing protective or therapeutic immunity against breast cancer having low/intermediate HER2/neu expression pending in the United States, China, European Union, Hong Kong, Japan, and South Korea, and which, if granted, are expected to expire in 2028.

Competition

Cancer immunotherapy has become a significant growth area for the biopharmaceutical industry, attracting large pharmaceutical companies as well as small niche players. Generally, our principal competitors in the cancer immunotherapy market comprise both companies with currently approved products for various indications, such as manufacturers of approved cancer immunotherapy products and companies currently engaged in clinical development of such products. Generally, the classes of these products include checkpoint inhibitors, bispecific antibodies, chimeric antigen receptor-engineered T-cell, or CAR-T, and NK-cell and T-cell receptor-engineered T-cell therapies, as well as interleukins, cytokines and tumor microenvironment inflammasome modulators. The large and medium-size competitors who have successfully obtained approval for cancer immunotherapy products include Bristol-Myers Squib Company, or BMS, Merck & Co., Inc., Genentech, Inc. (a subsidiary of Roche Holding AG), AstraZeneca PLC, Johnson & Johnson/Janssen Pharmaceuticals, Amgen, Novartis, Gilead Sciences, Inc. and Pfizer, Inc. Most of these companies, either alone or together with their collaborative partners, have substantially greater resources than we do.

Companies developing novel products with similar indications to those we are pursuing are expected to influence our ability to penetrate and maintain market share. Principal competitors for our AML indication broadly include both companies with currently approved products in AML, such as AbbVie/Genentech (the holders of rights to VENCLEXTA), Servier (the holder of U.S. rights to TIBSOVO), Novartis AG (the holder of rights to RYDAPT), Astellas Pharmaceuticals (the holder of rights to XOSPATA), BMS (the holder of rights to ONUREG/VIDAZA and IDHIFA), Otsuka Pharmaceutical Co., Ltd. (the holder of rights to DACOGEN), among others, as well as those with front-line chemotherapy drugs and maintenance therapies such as Jazz Pharmaceuticals, Inc. (the holder of rights to VYXEOS), Pfizer, Inc. (the holder of rights to MYLOTARG and DAURISMO), among others, as well as companies with drugs currently in development for AML, such as Daiichi Sankyo (the holder of rights to quizartinib/licensed in Japan under the name VANFLYTA), Karyopharm Therapeutics, Inc. (the holder of rights to XPOVIO), Pfizer, Inc./AROG Pharmaceuticals, LLC (the holders of rights to crenolanib), Novartis AG (the holder of rights to sabatolimab, or MBG453), Johnson & Johnson/Janssen Pharmaceuticals, Inc. (the holder of rights to cusatuzumab, or ARGX-110/JNJ-4550), Gilead Sciences, Inc. (the holder of rights to magrolimab, or Hu5F9 G4), Actinium Pharmaceuticals, Inc. (the holder of rights to [131]-iodine-apamistamab), Syndax (the holder of rights to SNDX-5613), Aptose Biosciences (the holder of rights to HM43239), among others. Companies currently engaged in the clinical development of AML therapies with an immunological/immuno-modulatory mechanism of action include Pfizer, Inc./EMD Serono (the holders of rights to BAVENCIO), BMS (the holder of rights to YERVOY) MacroGenics, Inc./Les Laboratoires Servier, SA (the holders of rights to flotetuzumab, or MGD006), ImmunoGen (the holder of rights to IMGN632), Celyad Oncology SA (the holder of rights to CYAD-01), Fortress Biotech, Inc, (the holder of rights to CNDO-109), Glycostem Therapeutics BV (the holder of rights to oNKord), iCell Gene Therapeutics, LLC (the holder of rights to CLL-CD33 Compound CAR T-cell), among others. Companies currently engaged in the clinical development of WT1-targeting vaccines (not specifically for AML) include Otsuka Pharmaceutical Co., Ltd. (the holder of rights to OCV-501) and Dainippon Sumitomo Pharma Co., Ltd./ Boston Biomedical, Inc. (the holder of rights to DSP-7888)/ade-gramotide/nelatimotide).

For patients with early stage breast cancer, adjuvant therapy is often given to prevent recurrence and increase the chance of long-term DFS. Adjuvant therapy for breast cancer can include chemotherapy, hormonal therapy, radiation therapy, or combinations thereof. In addition, the HER2 targeting drug trastuzumab (HERCEPTIN) - alone or in combination with pertuzumab (PERJETA), both manufactured and marketed by Roche/Genentech, may be given to patients with tumors with high expression of HER2 (HER2-positive). Various other novel targets are in clinical studies in breast cancer, such as MUC1, in the context of antigen-specific immunotherapy. In addition, the FDA recently approved the first ever immunotherapy regimen for TNBC that cannot be removed with surgery and is locally advanced or metastatic, the combination of the PD-L1 checkpoint inhibitor atezolizumab (TECENTRIQ; Roche/Genentech) with nab-paclitaxel (ABRAXANE; Celgene/BMS). This combination could be further developed for earlier stages of the disease, including the adjuvant setting, which could then become directly competitive with NPS. The FDA also recently approved the HER2-targeting antibody drug conjugate (ADC) Fam-trastuzumab deruxtecan-nxki (ENHERTU, Daiichi Sankyo/AstraZeneca), which may have activity in patients harboring breast cancers with low-to-intermediate (IHC1+/2+) HER2 expression (including TNBC), and which has the potential of becoming directly competitive with NPS. Three additional ADCs have shown clinical activity against metastatic TNBC. The first (sacituzumab govetecan-hziy, or TROPELVY), targeting TROP-2 and developed by Gilead/Immunomedics, recently received FDA approval. Both Daiichi Sankyo/AstraZeneca (the holders of rights to the TROP2-targeting DS-1062) and MacroGenics, Inc. (the holder of rights to the B7-H3-targeting MGC018) are performing late-stage clinical trials in this setting. These ADCs have the potential to move toward frontline therapy for early-state TNBC and could become directly competitive with NPS.

With regard to additional competition for NPS in the adjuvant setting for TNBC, there are several cancer vaccines in development for breast cancer, including but not limited toTPIV200, a folate receptor alpha peptide vaccine (Marker Therapeutics, Inc.), as well as two HER2-targeted vaccines: AE-37 (NuGenerex Immuno-Oncology), and GP2 (Greenwich Lifesciences, Inc.). While these development-stage product candidates are aimed at a number of different targets, and both AE-37 and GP2 have published data in the HER2-positive (IHC3+) breast cancer patient population, there is no guarantee that any of these compounds will not in the future be investigated in clinical trials in patients with low-to-intermediate (IHC1+/2+) HER2 breast cancer (including TNBC patients) and become directly competitive with NPS.

Both with regard to GPS and NPS, many of our competitors, either alone or with their strategic partners, have substantially greater financial, technical and human resources than we do, and also greater experience in obtaining FDA and other regulatory approvals of treatments and commercializing those treatments. Accordingly, our competitors may be more successful than us in obtaining approval for cancer immunotherapy products and achieving widespread market acceptance. Our competitors' treatments may be more effectively marketed and sold than any products we may commercialize, thus causing limited market share before we can recover the expenses of developing and commercializing of our cancer immunotherapy product candidate.

Mergers and acquisitions in the biotechnology and pharmaceutical industries may result in even more resources being concentrated among a smaller number of our competitors. Smaller or early stage companies may also prove to be significant competitors, particularly through collaborative arrangements with large and established companies. These activities may lead to consolidated efforts that allow for more rapid development of cancer immunotherapy product candidates.

These competitors also compete with us in recruiting and retaining qualified scientific and management personnel, the ability to work with specific clinical contract organizations due to conflict of interest, and also the conduct of trials in the ability to recruit clinical trial sites and subjects for our clinical trials.

We expect any products that we develop and commercialize to compete on the basis of, among other things, efficacy, safety, price 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 viewed as safer, more convenient or 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 current product candidates or any other future product candidate, which could result in our competitors establishing a strong market position before we are able to enter the market.

Government Regulation

The FDA and other regulatory authorities at federal, state, and local levels, as well as in foreign countries, extensively regulate, among other things, the research, development, testing, manufacture, quality control, import, export, safety, effectiveness, labeling, packaging, storage, distribution, record keeping, approval, advertising, promotion, marketing, post-approval monitoring, and post-approval reporting of biologics such as those we are developing. Along with third-party contractors, we will be required to navigate the various preclinical, clinical and commercial approval requirements of the governing regulatory agencies of the countries in which we wish to conduct studies or seek approval or licensure of its current or future product candidates. The process of obtaining regulatory approvals and the subsequent compliance with appropriate federal, state, local, and foreign statutes and regulations require the expenditure of substantial time and financial resources. A company can make only those claims relating to safety and efficacy, purity and potency that are approved by the FDA and in accordance with the provisions of the approved label.

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

- completion of extensive preclinical laboratory tests and animal studies performed in accordance with the FDA's current Good Laboratory Practices, or GLP, regulations or other applicable regulations;
- submission to the FDA of an IND application, which must become effective before clinical trials may begin and must be updated annually or when significant changes are made;
- approval by an IRB, or ethics committee at each clinical site before the trial is begun;
- performance of adequate and well-controlled human clinical trials in accordance with good clinical practices, or GCP, and other clinical-trial related regulations to establish the safety, purity and potency of the investigational biologic product candidate for its proposed indication;
- preparation of and submission to the FDA of a BLA, after completion of all pivotal clinical trials;
- satisfactory completion of an FDA Advisory Committee review, if applicable;
- a determination by the FDA within 60 days of its receipt of a BLA to file the application for review;
- satisfactory completion of an FDA pre-approval inspection of the manufacturing facility or facilities at which the proposed product is produced to assess compliance with current Good Manufacturing Practices, or cGMP, and to assure that the facilities, methods and controls are adequate to preserve the biological product's continued safety, purity and potency;
- potential audit of selected clinical trial sites to assess compliance with current GCP and the integrity of the clinical data submitted in support of the BLA; and
- FDA review and approval of the BLA to permit commercial marketing of the product for particular indications for use in the United States.

The testing and approval process requires substantial time, effort and financial resources, and we cannot be certain that any approvals for our current or future product candidates will be granted on a timely basis, if at all.

Preclinical studies

Before testing any drug or biological product candidate, including our product candidates, in humans, the product candidate must undergo rigorous preclinical testing. The preclinical developmental stage generally involves laboratory evaluations of drug chemistry, formulation and stability, as well as studies to evaluate toxicity in animals, which support subsequent clinical testing. Preclinical studies include laboratory evaluation of product chemistry and formulation, as well as in vitro and animal studies to assess the potential for adverse events and in some cases to establish a rationale for therapeutic use. The conduct of preclinical studies is subject to federal regulations and requirements, including GLP regulations for safety/toxicology studies. Some long-term preclinical testing, such as animal tests of reproductive adverse events and carcinogenicity, may continue after an IND for an investigational drug candidate is submitted to the FDA and human clinical trials have been initiated.

Prior to beginning the first clinical trial with a product candidate, we must submit an IND to the FDA. An IND is a request for authorization from the FDA to administer an investigational new drug product to humans. The central focus of an IND submission is on the general investigational plan and the protocol(s) for clinical studies. The IND also includes the results of the preclinical studies, together with manufacturing information, analytical data, any available clinical data or literature. An IND must become effective before human clinical trials may begin. The IND automatically becomes effective 30 days after receipt by the FDA, unless the FDA, within the 30-day time period, raises safety concerns or questions about the proposed clinical trial. In such a case, the IND may be placed on clinical hold and the IND sponsor and the FDA must resolve any outstanding concerns or questions before the clinical trial can begin. Submission of an IND therefore may or may not result in FDA authorization to begin a clinical trial.

Human clinical trials in support of a BLA

Clinical trials involve the administration of the investigational product to human subjects under the supervision of qualified investigators in accordance with GCP, which include the requirement that all research subjects provide their informed consent for their participation in any clinical trial. Clinical trials are conducted under protocols detailing, among other things, the objectives of the clinical trial, the parameters to be used in monitoring safety and the effectiveness criteria to be evaluated. A separate submission to the existing IND must be made for each successive clinical trial conducted during product development and for any subsequent protocol amendments. Furthermore, an IRB for each site proposing to conduct the clinical trial must review and approve the plan for any clinical trial and its informed consent form before the clinical trial begins at that site and must monitor the clinical trial until completed. Regulatory authorities, the IRB or the sponsor may suspend a clinical trial at any time on various grounds, including a finding that the subjects are being exposed to an unacceptable health risk or that the trial is unlikely to meet its stated objectives. Some studies also include oversight by an independent data safety monitoring board, or DSMB, organized by the clinical trial sponsor, which provides authorization for whether or not a clinical trial may move forward at designated check points based on access to certain data from the clinical trial and may halt the clinical trial if it determines that there is an unacceptable safety risk for subjects or other grounds, such as no demonstration of efficacy.

Information about certain clinical trials, including details of the protocol and eventually study results, also must be submitted within specific timeframes to the NIH for public dissemination on the ClinicalTrials.gov data registry. Information related to the product, patient population, phase of investigation, study sites and investigators and other aspects of the clinical trial is made public as part of the registration of the clinical trial. Sponsors are also obligated to disclose the results of their clinical trials after completion. Disclosure of the results of these trials can be delayed in some cases for up to two years after the date of completion of the trial. Competitors may use this publicly available information to gain knowledge regarding the progress of development programs. Failure to timely register a covered clinical study or to submit study results as provided for in the law can give rise to civil monetary penalties and also prevent the non-compliant party from receiving future grant funds from the federal government. The NIH Final Rule on ClinicalTrials.gov registration and reporting requirements became effective in 2017, and both NIH and FDA have recently begun enforcing those requirements against non-compliant clinical trial sponsors.

For purposes of BLA approval, human clinical trials are typically conducted in three sequential phases that may overlap.

- **Phase 1**-The investigational product is initially introduced into healthy human subjects or patients with the target disease or condition. These studies are designed to test the safety, dosage tolerance, absorption, metabolism and distribution of the investigational product in humans, the side effects associated with increasing doses, and, if possible, to gain early evidence on effectiveness.
- **Phase 2**-The investigational product is administered to a limited patient population with a specified disease or condition to evaluate the preliminary efficacy, optimal dosages and dosing schedule and to identify possible adverse side effects and safety risks. Multiple Phase 2 clinical trials may be conducted to obtain information prior to beginning larger and more expensive Phase 3 clinical trials.
- **Phase 3**-The investigational product is administered to an expanded patient population to further evaluate dosage, to provide statistically significant evidence of clinical efficacy and to further test for safety, generally at multiple geographically dispersed clinical trial sites. These clinical trials are intended to establish the overall risk/benefit ratio of the investigational product and to provide an adequate basis for product approval and labeling. These trials may include comparisons with placebo and/or other comparator treatments. The duration of treatment is often extended to mimic the actual use of a product during marketing.
- **Phase 4**-In some cases, the FDA may require, or companies may voluntarily pursue, additional clinical trials after a product is approved to gain additional information and experience from the treatment of patients in the intended therapeutic indication, particularly for long-term safety follow up. These so-called Phase 4 studies may be made a condition to approval of the BLA.

Phase 1, Phase 2 and Phase 3 testing may not be completed successfully within a specified period, if at all, and there can be no assurance that the data collected will support FDA approval or licensure of the product.

Progress reports detailing the results of the clinical trials must be submitted at least annually to the FDA and more frequently if serious adverse events, or SAEs, occur. The FDA or the sponsor 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 clinical protocol, GCP, or other IRB requirements or if the drug has been associated with unexpected serious harm to patients.

Concurrent with clinical trials, companies may complete additional animal studies and develop additional information about the biological characteristics of the product candidate and must finalize a process for manufacturing the product in commercial quantities in accordance with cGMP requirements. The manufacturing process must be capable of consistently producing quality batches of the product candidate and, among other things, must incorporate methods for testing the identity, strength, quality and purity of the final product, or for biologics, the safety, purity and potency. Additionally, appropriate packaging must be selected and tested, and stability studies must be conducted to demonstrate that the product candidate does not undergo unacceptable deterioration over its shelf life.

BLA Submission and Review by the FDA

Assuming successful completion of all required testing in accordance with all applicable regulatory requirements, the results of product development, preclinical studies and clinical trials are submitted to the FDA as part of a BLA requesting approval to market the product for one or more indications. The BLA must contain proof of the biological product candidate's safety, purity, potency and efficacy for its proposed indication or indications in the form of relevant data available from pertinent preclinical and clinical studies, including negative or ambiguous results as well as positive findings, together with detailed information relating to the product's chemistry, manufacturing, controls, and proposed labeling, among other things. Data can come from company-sponsored clinical studies intended to test the safety and effectiveness of a use of the product, or from a number of alternative sources, including studies initiated by investigators. FDA approval of a BLA must be obtained before the corresponding biologic may be marketed in the United States.

Under federal law, the fee for the submission of a BLA for which clinical data is submitted and analyzed is substantial (for example, for FY2022 this application fee exceeds $3.1 million), and the sponsor of an approved BLA is also subject to an annual program fee, currently more than $360,000 per program. These fees are typically increased annually, but exemptions and waivers may be available under certain circumstances (such as a waiver for the first human drug application submitted by a qualifying small business and exemptions for orphan products).

The FDA reviews all BLAs submitted to determine if they are substantially complete before it accepts them for filing and may request additional information rather than accepting an BLA for filing. The FDA must make a decision on accepting a BLA for filing within 60 days of receipt and must inform the sponsor by the 74th day after the FDA's receipt of the submission whether the application is sufficiently complete to permit substantive review. 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 requested by the agency. The resubmitted application is also subject to review before the FDA accepts it for filing.

Once a BLA is accepted for filing, the FDA's goal is to review the application within ten months after it accepts the application for filing, or, if the application meets the criteria for "priority review", six months after the FDA accepts the application for filing. The review process is often significantly extended by FDA requests for additional information or clarification after the BLA has been accepted for filing.

During the review process, the FDA reviews the BLA to determine, among other things, whether the product is safe, pure and potent and the facility in which it is manufactured, processed, packed, or held meets standards designed to assure the product's continued safety, purity and potency. The FDA may refer any BLA, including applications for novel biologic candidates which present difficult questions of safety or efficacy to an advisory committee to provide clinical insight on application review questions. Typically, an advisory committee is a panel of independent experts, including clinicians and other scientific experts that reviews, evaluates and provides a recommendation as to whether the application should be approved and under what conditions. The FDA is not bound by the recommendation of an advisory committee, but it considers such recommendations carefully when making final decisions on approval.

Before approving a BLA, the FDA will typically inspect the facility or facilities where the product is manufactured. The FDA will not approve an application unless it determines that the manufacturing processes and facilities are in compliance with cGMP 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 compliance with GCP. If the FDA determines that the application, manufacturing process or manufacturing facilities are not acceptable, it will outline the deficiencies as part of the review process and often will request additional testing or information. Notwithstanding the submission of any requested additional information, the FDA ultimately may decide that the application does not satisfy the regulatory criteria for approval.

Under the Pediatric Research Equity Act, or PREA, amendments to the FDCA, a BLA or supplement to a BLA must contain data that are adequate to assess the safety and efficacy of the product candidate for the claimed indications in all relevant pediatric populations and to support dosing and administration for each pediatric population for which the product is safe and effective. The FDA may grant deferrals for submission of pediatric data or full or partial waivers. The PREA requires a sponsor that is planning to submit a marketing application for a product that includes a new active ingredient, new indication, new dosage form, new dosing regimen or new route of administration to submit an initial Pediatric Study Plan, or PSP, within sixty days of an end-of-Phase 2 meeting or, if there is no such meeting, as early as practicable before the initiation of the Phase 3 or Phase 2/3 clinical trial. The initial PSP must include an outline of the pediatric study or studies that the sponsor plans to conduct, including trial objectives and design, age groups, relevant endpoints and statistical approach, or a justification for not including such detailed information, and any request for a deferral of pediatric assessments or a full or partial waiver of the requirement to provide data from pediatric studies along with supporting information. The FDA and the sponsor must reach an agreement on the PSP. A sponsor can submit amendments to an agreed upon initial PSP at any time if changes to the pediatric plan need to be considered based on data collected from pre-clinical studies, early-phase clinical trials or other clinical development programs.

The testing and approval process requires substantial time, effort and financial resources, and each may take several years to complete. The FDA may not grant approval on a timely basis, or at all, and we may encounter difficulties or unanticipated costs in our efforts to secure necessary governmental approvals, which could delay or preclude us from marketing its products. After the FDA evaluates a BLA and conducts inspections of the manufacturing facilities where the investigational product and/or its drug substance will be produced, the FDA may issue an approval letter or a Complete Response Letter, or CRL. An approval letter authorizes commercial marketing of the product with specific prescribing information for specific indications. A CRL indicates that the review cycle of the application is complete and the application is not ready for approval. A CRL generally outlines the deficiencies in the submission and may require substantial additional testing, information or clarification for FDA to reconsider the application. The FDA may delay or refuse approval of a BLA if applicable regulatory criteria are not satisfied, require additional testing or information and/or require post-marketing testing and surveillance to monitor safety or efficacy of a product. If a CRL is issued, the applicant may either resubmit the BLA, addressing all of the deficiencies identified in the letter, or withdraw the application. If and when the deficiencies have been addressed to the FDA's satisfaction in a resubmission of the BLA, the FDA will issue an approval letter. The FDA has committed to reviewing such resubmissions in response to an issued CRL in either two or six months depending on the type of information included. Even if such data and information are submitted, the FDA may ultimately decide that the BLA does not satisfy the criteria for approval.

If regulatory approval of a product is granted, such approval is limited to the conditions of use (e.g., patient population, indication) described in the application and may entail further limitations on the indicated uses for which such product may be marketed. For example, the FDA may approve the BLA with a Risk Evaluation and Mitigation Strategy, or REMS, plan to mitigate risks, which could include medication guides, physician communication plans, or elements to assure safe use, such as restricted distribution methods, patient registries and other risk minimization tools. The FDA determines the requirement for a REMS, as well as the specific REMS provisions, on a case-by-case basis. If the FDA concludes a REMS plan is needed, the sponsor of the BLA must submit a proposed REMS. The FDA will not approve a BLA without a REMS, if one is required. The FDA also may condition approval on, among other things, changes to proposed labeling (e.g., adding contraindications, warnings or precautions) or the development of adequate controls and specifications. Once approved, the FDA may withdraw the product approval if compliance with pre- and post-marketing regulatory standards is not maintained or if problems occur after the product reaches the marketplace. The FDA may require one or more Phase 4 post-market studies and surveillance to further assess and monitor the product's safety and effectiveness after commercialization and may limit further marketing of the product based on the results of these post-marketing studies. After approval, some types of changes to the approved product, such as adding new indications, manufacturing changes and additional labeling claims, are subject to further testing requirements and FDA review and approval. In addition, new government requirements, including those resulting from new legislation, may be established, or the FDA's policies may change, which could delay or prevent regulatory approval of our products under development.

Fast Track, Priority Review, and Breakthrough Therapy Designations

A sponsor may seek approval of its product candidate under programs designed to accelerate FDA's review and approval of new drugs and biological products that meet certain criteria. Specifically, new drugs and biological products are eligible for Fast Track designation if they are intended to treat a serious or life-threatening condition and demonstrate the potential to address unmet medical needs for the condition. Fast Track designation provides increased opportunities for sponsor interactions with the FDA during preclinical and clinical development, in addition to the potential for rolling review once a marketing application is filed, meaning that the FDA may consider for review sections of the BLA on a rolling basis before the complete application is submitted, if the sponsor provides a schedule for the submission of the sections of the BLA, the FDA agrees to accept sections of the BLA and determines that the schedule is acceptable, and the sponsor pays any required user fees upon submission of the first section of the application. A Fast Track designated product candidate may also qualify for accelerated approval (described below) or priority review, under which the FDA sets the target date for FDA action on the BLA at six months after the FDA accepts the application for filing. We have obtained Fast Track designation for GPS in AML, MPM, and MM, and for NPS in TNBC. Priority review is granted when there is evidence that the proposed product would be a significant improvement in the safety or effectiveness of the treatment, diagnosis, or prevention of a serious condition. Significant improvement may be illustrated by evidence of increased effectiveness in the treatment of a condition, elimination or substantial reduction of a treatment-limiting drug reaction, documented enhancement of patient compliance that may lead to improvement in serious outcomes, or evidence of safety and effectiveness in a new subpopulation. If criteria are not met for priority review, the application is subject to the standard FDA review period of ten months after FDA accepts the application for filing.

In addition, a sponsor may seek FDA designation of its product candidate as a Breakthrough Therapy, if the product candidate is intended, alone or in combination with one or more other drugs or biologics, to treat a serious or life-threatening disease or condition and preliminary clinical evidence indicates that the therapy may demonstrate substantial improvement over existing therapies on one or more clinically significant endpoints, such as substantial treatment effects observed early in clinical development. Breakthrough Therapy designation provides all the features of Fast Track designation in addition to intensive guidance on an efficient development program beginning as early as Phase 1, and FDA organizational commitment to expedited development, including involvement of senior managers and experienced review and regulatory staff in a proactive, collaborative, cross-disciplinary review, where appropriate. A drug designated as Breakthrough Therapy is also eligible for Accelerated Approval if the relevant criteria are met.

Even if a product qualifies for one or more of these programs, the FDA may later decide that the product no longer meets the conditions for qualification or decide that the time period for FDA review or approval will not be shortened. Fast Track, priority review and Breakthrough Therapy designations do not change the scientific or medical standards for approval or the quality of evidence necessary to support approval but may expedite the development or approval process.

Accelerated Approval

In addition, products studied for their safety and effectiveness in treating serious or life-threatening illnesses and that provide meaningful therapeutic benefit over existing treatments may receive accelerated approval from the FDA and may be approved on the basis of adequate and well-controlled clinical trials establishing that the drug product has an effect on a surrogate endpoint that is reasonably likely to predict clinical benefit. The FDA may also grant accelerated approval for such a drug or biologic when it has an effect on an intermediate clinical endpoint that can be measured earlier than an effect on irreversible morbidity or mortality, or IMM, and that is reasonably likely to predict an effect on IMM or other clinical benefit, taking into account the severity, rarity, or prevalence of the condition and the availability or lack of alternative treatments. As a condition of approval, the FDA may require that a sponsor of a drug or biologic receiving accelerated approval perform post-marketing clinical trials to verify and describe the predicted effect on IMM or other clinical endpoint, and the product may be subject to expedited withdrawal procedures. Drugs and biologics granted accelerated approval must meet the same statutory standards for safety and effectiveness as those granted traditional approval.

For the purposes of accelerated approval, a surrogate endpoint is a marker, such as a laboratory measurement, radiographic image, physical sign, or other measure that is thought to predict clinical benefit, but is not itself a measure of clinical benefit. Surrogate endpoints can often be measured more easily or more rapidly than clinical endpoints. An intermediate clinical endpoint is a measurement of a therapeutic effect that is considered reasonably likely to predict the clinical benefit of a drug or biologic, such as an effect on IMM. The FDA has limited experience with accelerated approvals based on intermediate clinical endpoints, but has indicated that such endpoints generally may support accelerated approval when the therapeutic effect measured by the endpoint is not itself a clinical benefit and basis for traditional approval, if there is a basis for concluding that the therapeutic effect is reasonably likely to predict the ultimate long-term clinical benefit of a drug.

The accelerated approval pathway is most often used in settings in which the course of a disease is long and an extended period of time is required to measure the intended clinical benefit of a drug, even if the effect on the surrogate or intermediate clinical endpoint occurs rapidly. For example, accelerated approval has been used extensively in the development and approval of drugs and biologics for treatment of a variety of cancers in which the goal of therapy is generally to improve survival or decrease morbidity and the duration of the typical disease course requires lengthy and sometimes large clinical trials to demonstrate a clinical or survival benefit.

The accelerated approval pathway is usually contingent on a sponsor's agreement to conduct, in a diligent manner, additional post-approval confirmatory studies to verify and describe the product candidate's clinical benefit. As a result, a product candidate approved on this basis is subject to rigorous post-marketing compliance requirements, including the completion of Phase 4 or post-approval clinical trials to confirm the effect on the clinical endpoint. Failure to conduct required post-approval studies, or to confirm the predicted clinical benefit of the product during post-marketing studies, would allow the FDA to withdraw approval of the product. All promotional materials for product candidates being considered and approved under the accelerated approval program are subject to prior review by the FDA.

Orphan Drugs

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

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

A biologic with Orphan Drug Product Designation may not receive orphan product exclusivity if it is approved for a use that is broader than the indication for which it received Orphan Drug Product Designation. In addition, orphan product exclusive marketing rights in the United States may be lost if the FDA later determines that the request for designation was materially defective or if the manufacturer is unable to assure sufficient quantities of the product to meet the needs of patients with the rare disease or condition. We have obtained Orphan Drug Product Designation in the United States for GPS in AML, MPM and MM.

Pediatric exclusivity

Pediatric exclusivity is a type of non-patent marketing exclusivity available in the United States and, if granted, it provides for the attachment of an additional six months of marketing protection to the term of any existing regulatory exclusivity or listed patents. This six-month exclusivity may be granted if a BLA sponsor submits pediatric data that fairly respond to a written request from the FDA for such data. The data do not need to show the product to be effective in the pediatric population studied; rather, if the clinical trial is deemed to fairly respond to the FDA's request, the additional protection is granted. If reports of requested pediatric studies are submitted to and accepted by the FDA within the statutory time limits, whatever statutory or regulatory periods of exclusivity or patent protection cover the product are extended by six months. This is not a patent term extension, but it effectively extends the regulatory period during which the FDA cannot approve another application. The issuance of a written request does not require the sponsor to undertake the described studies.

Patent Term Restoration and Reference product exclusivity for biological products

Depending upon the timing, duration and specifics of FDA approval of the use of our product candidates, some of our United States patents may be eligible for limited patent term extension under the Hatch-Waxman Act. The Hatch-Waxman Act permits a patent restoration term of up to five years as compensation for patent term lost during product development and the FDA regulatory review process. However, patent term restoration cannot extend the remaining term of a patent beyond a total of 14 years from the product candidate's approval date. The patent term restoration period is generally one half of the time between the effective date of an IND and the submission date of a BLA, plus the time between the submission date of a BLA and the approval of that application, except that the review period is reduced by any time during which the applicant failed to exercise due diligence. Only one patent applicable to an approved product candidate is eligible for the extension and the application for extension must be made prior to expiration of the patent. The USPTO, in consultation with the FDA, reviews and approves the application for any patent term extension or restoration. In the future, we intend to apply for restorations of patent term for some of our currently owned or licensed patents to add patent life beyond their current expiration date, depending on the expected length of clinical trials and other factors involved in the submission of the relevant BLA.

The Biologics Price Competition and Innovation Act of 2009 (BPCIA) amended the PHSA to authorize the FDA to approve similar versions of innovative biologics such as ours, which are also known as "reference biological products." The new pathway authorized under the BPCIA allows FDA to approve, under an abbreviated application, a biological product that are demonstrated to be "biosimilar" or "interchangeable" with an FDA-licensed reference biological product. Biosimilarity to an approved reference product requires that there be no differences in conditions of use, route of administration, dosage form, and strength, and no clinically meaningful differences between the follow-on biological product and the reference product in terms of safety, purity, and potency. Biosimilarity is demonstrated in steps beginning with rigorous analytical studies or "fingerprinting", *in vitro* studies, *in vivo* animal studies, and generally at least one clinical study, absent a waiver from the FDA. The biosimilarity exercise tests the hypothesis that the investigational product and the reference product are the same. If at any point in the stepwise biosimilarity process a significant difference is observed, then the products are not biosimilar, and the development of a standalone BLA is necessary. In order to meet the higher hurdle of interchangeability, a sponsor must demonstrate that the biosimilar product can be expected to produce the same clinical result as the reference product, and for a product that is administered more than once, that the risk of switching between the reference product and biosimilar product is not greater than the risk of maintaining the patient on the reference product. Complexities associated with the larger, and often more complex, structures of biological products, as well as the process by which such products are manufactured, pose significant hurdles to implementation that are still being evaluated by the FDA.

Under the BPCIA, a reference biological product is granted twelve years of data exclusivity from the date of first licensure of the product, which means that the FDA is barred from approving biosimilar applications for 12 years after the reference biological product receives initial marketing approval. In addition, the FDA will not accept an application for a biosimilar or interchangeable product based on the reference biological product until four years after the date of first licensure of the reference product. “First licensure” typically means the initial date the particular product at issue was licensed in the United States. Date of first licensure does not include the date of licensure of (and a new period of exclusivity is not available for) a supplement for the reference product for a subsequent application filed by the same sponsor or manufacturer of the reference product (or licensor, predecessor in interest or other related entity) for a change (not including a modification to the structure of the biological product) that results in a new indication, route of administration, dosing schedule, dosage form, delivery system, delivery device or strength or for a modification to the structure of the biological product that does not result in a change in safety, purity or potency. Therefore, one must determine whether a new product includes a modification to the structure of a previously licensed product that results in a change in safety, purity or potency to assess whether the licensure of the new product is a first licensure that triggers its own period of exclusivity. Whether a subsequent application, if approved, warrants exclusivity as the “first licensure” of a biological product is determined on a case-by-case basis with data submitted by the sponsor.

The BPCIA is complex and only beginning to be interpreted and implemented by the FDA. In addition, recent government proposals have sought to reduce the twelve-year reference product exclusivity period. Other aspects of the BPCIA, some of which may impact the BPCIA exclusivity provisions, have also been the subject of recent litigation. As a result, the ultimate impact, implementation and meaning of the BPCIA continues to be subject to significant uncertainty.

Post-approval requirements

Following approval of a new product, the manufacturer and the approved product are subject to pervasive and continuing regulation by the FDA, including, among other things, monitoring and recordkeeping activities, reporting of adverse experiences with the product, product sampling and distribution restrictions, complying with promotion and advertising requirements, which include restrictions on promoting drugs for unapproved uses or patient populations (i.e., “off-label use”) and limitations on industry-sponsored scientific and educational activities. The manufacturer and its products are also subject to similar post-approval requirements by regulatory authorities comparable to FDA in jurisdictions outside of the United States where the products are approved. Although physicians may prescribe legally available products for off-label uses, manufacturers may not market or promote such uses. The FDA and other agencies actively enforce the laws and regulations prohibiting the promotion of off-label uses, and a company that is found to have improperly promoted off-label uses may be subject to significant liability. If there are any modifications to the product, including changes in indications, labeling or manufacturing processes or facilities, the applicant may be required to submit and obtain FDA approval of a new BLA or a BLA supplement, which may require the applicant to develop additional data or conduct additional pre-clinical studies and clinical trials. The FDA may also place other conditions on approvals including the requirement for a REMS to assure the safe use of the product. A REMS could include medication guides, physician communication plans or elements to assure safe use, such as restricted distribution methods, patient registries and other risk minimization tools. Any of these limitations on approval or marketing could restrict the commercial promotion, distribution, prescription or dispensing of products. Product approvals may be withdrawn for non-compliance with regulatory standards or if problems occur following initial marketing.

FDA regulations require that products be manufactured in specific approved facilities and in accordance with cGMPs. The cGMP regulations include requirements relating to organization of personnel, buildings and facilities, equipment, control of components and drug product containers and closures, production and process controls, packaging and labeling controls, holding and distribution, laboratory controls, records and reports and returned or salvaged products. The manufacturing facilities for our product candidates must meet applicable cGMP requirements to the FDA's or comparable foreign regulatory authorities' satisfaction before any product is approved and our commercial products can be manufactured. We rely, and expect to continue to rely, on third parties for the production of clinical and commercial quantities of our products in accordance with cGMP regulations. These manufacturers must comply with cGMP regulations that require, among other things, quality control and quality assurance, the maintenance of records and documentation and the obligation to investigate and correct any deviations from cGMP. Manufacturers and other entities involved in the manufacture and distribution of approved drugs or biologics are required to register their establishments with the FDA and certain state agencies and are subject to periodic prescheduled or unannounced inspections by the FDA and certain state agencies for compliance with cGMP and other laws. Accordingly, manufacturers must continue to expend time, money and effort in the area of production and quality control to maintain cGMP compliance. Future inspections by the FDA and other regulatory agencies may identify compliance issues at the facilities of our CMOs that may disrupt production or distribution or require substantial resources to correct. In addition, the discovery of conditions that violate these rules, including failure to conform to cGMPs, could result in enforcement actions, and the discovery of problems with a product after approval may result in restrictions on a product, manufacturer or holder of an approved BLA, including voluntary recall and regulatory sanctions as described below.

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

- restrictions on the marketing or manufacturing of the product, complete withdrawal of the product from the market or product recalls;
- fines, warning letters or other enforcement-related letters or clinical holds on post-approval clinical trials;
- refusal of the FDA to approve pending BLAs or supplements to approved BLAs, or suspension or revocation of product approvals;
- product seizure or detention, or refusal to permit the import or export of products;
- injunctions or the imposition of civil or criminal penalties; and
- consent decrees, corporate integrity agreements, debarment, or exclusion from federal health care programs; or mandated modification of promotional materials and labeling and the issuance of corrective information.

In addition, the distribution of prescription pharmaceutical products is subject to the Prescription Drug Marketing Act, or PDMA, which regulates the distribution of drugs and drug samples at the federal level and sets minimum standards for the registration and regulation of drug distributors by the states. Both the PDMA and state laws limit the distribution of prescription pharmaceutical product samples and impose requirements to ensure accountability in distribution. Most recently, the Drug Supply Chain Security Act, or DSCSA, was enacted with the aim of building an electronic system to identify and trace certain prescription drugs distributed in the United States, including most biological products. The DSCSA mandates phased-in and resource-intensive obligations for pharmaceutical manufacturers, wholesale distributors, and dispensers over a ten-year period that is expected to culminate in November 2023. From time to time, new legislation and regulations may be implemented that could significantly change the statutory provisions governing the approval, manufacturing and marketing of products regulated by the FDA. It is impossible to predict whether further legislative or regulatory changes will be enacted, whether FDA regulations, guidance or interpretations will be changed or what the impact of such changes, if any, may be.

Other Healthcare Laws and Compliance Requirements

Our sales, promotion, medical education and other activities following product approval will be subject to regulation by numerous regulatory and law enforcement authorities in the United States in addition to FDA, including potentially the Federal Trade Commission, or FTC, the Department of Justice, or DOJ, the Centers for Medicare and Medicaid Services, other divisions of the Department of Health and Human Services and state and local governments. Our promotional and scientific/educational programs must comply with the federal Anti-Kickback Statute, the Foreign Corrupt Practices Act, the False Claims Act, or FCA, the Veterans Health Care Act, physician payment transparency laws, privacy laws, security laws, and additional state laws similar to the foregoing.

The federal Anti-Kickback Statute prohibits, among other things, the offer, receipt, or payment of remuneration in exchange for or to induce the referral of patients or the use of products or services that would be paid for in whole or part by Medicare, Medicaid or other federal health care programs. Remuneration has been broadly defined to include anything of value, including cash, improper discounts, and free or reduced price items and services. The government has enforced the Anti-Kickback Statute to reach large settlements with healthcare companies based on sham research or consulting and other financial arrangements with physicians. Further, a person or entity does not need to have actual knowledge of the statute or specific intent to violate it to have committed a violation. In addition, the government may assert that a claim including items or services resulting from a violation of the federal Anti-Kickback Statute constitutes a false or fraudulent claim for purposes of the FCA. Many states have similar laws that apply to their state health care programs as well as private payors.

In November 2020, HHS finalized significant changes to the regulations implementing the Anti-Kickback Statute, as well as the Physician Self-Referral Law (Stark Law) and the civil monetary penalty rules regarding beneficiary inducements, with the goal of offering the health care industry more flexibility and reducing the regulatory burden associated with those fraud and abuse laws, particularly with respect to value-based arrangements among industry participants.

The FCA imposes liability on persons who, among other things, present or cause to be presented false or fraudulent claims for payment by a federal health care program. The FCA has been used to prosecute persons submitting claims for payment that are inaccurate or fraudulent, that are for services not provided as claimed, or for services that are not medically necessary. Actions under the FCA may be brought by the U.S. Attorney General or as a qui tam action by a private individual in the name of the government. Violations of the FCA can result in significant monetary penalties and treble damages. The federal government is using the FCA, and the accompanying threat of significant liability, in its investigation and prosecution of pharmaceutical and biotechnology companies throughout the country, for example, in connection with the promotion of products for unapproved uses and other sales and marketing practices. The government has obtained multi-million and multi-billion dollar settlements under the FCA in addition to individual criminal convictions under applicable criminal statutes. In addition, companies have been forced to implement extensive corrective action plans, and have often become subject to consent decrees or corporate integrity agreements, restricting the manner in which they conduct their business. The federal Health Insurance Portability and Accountability Act of 1996, or HIPAA, also created federal criminal statutes that prohibit, among other things, knowingly and willfully executing a scheme to defraud any healthcare benefit program, including private third-party payors and knowingly and willfully falsifying, concealing or covering up a material fact or making any materially false, fictitious or fraudulent statement in connection with the delivery of or payment for healthcare benefits, items or services. Given the significant size of actual and potential settlements, it is expected that the government will continue to devote substantial resources to investigating healthcare providers' and manufacturers' compliance with applicable fraud and abuse laws.

In addition, there has been a recent trend of increased federal and state regulation of payments made to physicians and other healthcare providers. The federal Physician Payments Sunshine Act, enacted as part of the Patient Protection and Affordable Care Act of 2010 (the "ACA") requires manufacturers of FDA-approved drugs, devices, biologics and medical supplies covered by Medicare or Medicaid to report, on an annual basis, to the U.S. Department of Health and Human Services information related to payments or other transfers of value made by them to U.S.-licensed physicians (defined to include doctors, dentists, optometrists, podiatrists and chiropractors) and teaching hospitals, as well as ownership and investment interests held by physicians and their immediate family members. Failure to submit required information may result in civil monetary penalties**.** Certain states also mandate implementation of commercial compliance programs, impose restrictions on drug manufacturer marketing practices and/or require the tracking and reporting of gifts, compensation and other remuneration to physicians and other healthcare professionals. Effective January 1, 2022, these reporting obligations will extend to include transfers of value made in the previous year to certain non-physician providers, including physician assistants, nurse practitioners, clinical nurse specialists, certified registered nurse anesthetists, anesthesiology assistants, and certified nurse midwives.

The federal criminal statutes enacted under HIPAA impose criminal liability for knowingly and willfully executing, or attempting to execute, a scheme to defraud any healthcare benefit program, including private third-party payors, or obtain, by means of false or fraudulent pretenses, representations, or promises, any of the money or property owned by, or under the custody or control of, any healthcare benefit program; knowingly and willfully embezzling or stealing from a healthcare benefit program; willfully preventing, obstructing, misleading, or delaying a criminal investigation of a healthcare offense; and knowingly and willfully falsifying, concealing or covering up a material fact or making any materially false statements in connection with the delivery of or payment for healthcare benefits, items or services. Similar to the federal Anti-Kickback Statute, a person or entity need not have actual knowledge of the statute or specific intent to violate it in order to have committed a violation.

We may also be subject to data privacy and security regulation by both the federal government and the states in which it conducts its business. HIPAA, as amended by the Health Information Technology and Clinical Health Act, or HITECH, and their respective implementing regulations, imposes specified requirements relating to the privacy, security and transmission of individually identifiable health information. Among other things, HITECH makes HIPAA's privacy and security standards directly applicable to "business associates," defined as independent contractors or agents of covered entities that create, receive, maintain or transmit protected health information in connection with providing a service for or on behalf of a covered entity. HITECH also increased the civil and criminal penalties that may be imposed against covered entities, business associates and possibly other persons, and gave state attorneys general new authority to file civil actions for damages or injunctions in federal courts to enforce the federal HIPAA laws and seek attorney's fees and costs associated with pursuing federal civil actions. In addition, state laws govern the privacy and security of health information in certain circumstances, many of which differ from each other in significant ways and may not have the same effect.

Pricing and rebate programs must comply with the Medicaid rebate requirements of the U.S. Omnibus Budget Reconciliation Act of 1990 and more recent requirements in the ACA. If products are made available to authorized users of the Federal Supply Schedule of the General Services Administration, additional laws and requirements apply. Prescription drug and biologic products also must meet applicable child-resistant packaging requirements under the U.S, Poison Prevention Packaging Act.

We may also be subject to analogous state and foreign laws and regulations, such as state anti-kickback and false claims laws, which may apply to sales or marketing arrangements and claims involving healthcare items or services reimbursed by non-governmental third party-payors, including private insurers, and may be broader in scope than their federal equivalents. The laws of some U.S. states and foreign jurisdictions require pharmaceutical companies to comply with the pharmaceutical industry's voluntary compliance guidelines and the relevant compliance guidance promulgated by the federal government or otherwise restrict payments that may be made to healthcare providers. In addition, certain state and foreign laws and regulations require disclosures to regulatory agencies and/or commercial purchasers with respect to certain price increases that exceed a certain level as identified in the relevant statutes, require drug manufacturers to report information related to payments and other transfers of value to physicians and other healthcare providers, and restrict marketing practices or require disclosure of marketing expenditures and pricing information. Some U.S. states also require registration of pharmaceutical sales representatives.

If our operations are found to be in violation of any of such laws or any other governmental regulations that apply to it, we may be subject to penalties, including, without limitation, civil and criminal penalties, damages, fines, the curtailment or restructuring of our operations, exclusion from participation in federal and state healthcare programs and imprisonment, any of which could adversely affect our ability to operate our business and our financial results. Also, the U.S. Foreign Corrupt Practices Act and similar worldwide anti-bribery laws generally prohibit companies and their intermediaries from making improper payments to foreign officials for the purpose of obtaining or retaining business. We cannot assure you that our internal control policies and procedures will protect us from reckless or negligent acts committed by our employees, future distributors, partners, collaborators or agents. Violations of these laws, or allegations of such violations, could result in fines, penalties or prosecution and have a negative impact on our business, results of operations and reputation.

General Data Protection Regulation.

The collection, use, disclosure, transfer, or other processing of personal data regarding individuals in the European Union, including personal health data, is subject to the European Union's General Data Protection Regulation, or GDPR, which became effective on May 25, 2018. The GDPR is wide-ranging in scope and imposes numerous requirements on companies that process personal data, including requirements relating to processing health and other sensitive data, obtaining consent of the individuals to whom the personal data relates, providing information to individuals regarding data processing activities, implementing safeguards to protect the security and confidentiality of personal data, providing notification of data breaches, and taking certain measures when engaging third-party processors. The GDPR also imposes strict rules on the transfer of personal data to countries outside the European Union, including the U.S., and permits data protection authorities to impose large penalties for violations of the GDPR, including potential fines of up to €20 million or 4% of annual global revenues, whichever is greater. The GDPR also confers a private right of action on data subjects and consumer associations to lodge complaints with supervisory authorities, seek judicial remedies, and obtain compensation for damages resulting from violations of the GDPR. The Company must comply with the GDPR in the performance of its clinical trials in the European Union, and relies on its CROs to implement appropriate safeguards and procedures relating to informed consent in order to ensure that trials are conducted in a manner consistent with the GDPR.

Coverage and Reimbursement

Sales of our products approved for marketing by the FDA and foreign regulatory authorities will depend, in part, on the extent to which our products will be covered by third-party payors, such as government health programs, commercial insurance and managed care organizations. In the United States no uniform policy of coverage and reimbursement for drug or biological products exists. Accordingly, decisions regarding the extent of coverage and amount of reimbursement to be provided for any of our products will be made on a payor-by-payor basis. Third-party payors are increasingly challenging drug prices and examining the medical necessity and cost-effectiveness of medical products and services, in addition to their safety and efficacy.

In order to secure coverage and reimbursement for any product that might be approved for sale, a company may need to conduct expensive pharmacoeconomic studies in order to demonstrate the medical necessity and cost-effectiveness of the product, in addition to the costs required to obtain FDA or other comparable regulatory approvals. A payor's decision to provide coverage for a product does not imply that an adequate reimbursement rate will be approved. Moreover, eligibility for reimbursement does not imply that any product will be paid for in all cases or at a rate that covers our costs, including research, development, manufacture, sale and distribution. Interim payments for new products, if applicable, may also not be sufficient to cover our costs and may not be made permanent. Payment rates may vary according to the use of the product and the clinical setting in which it is used, may be based on payments allowed for lower cost products that are already reimbursed and may be incorporated into existing payments for other services. Net prices for products may be reduced by mandatory discounts or rebates required by third-party payors and by any future relaxation of laws that presently restrict imports of products from countries where they may be sold at lower prices than in the United States. In the United States, third-party payors often rely upon Medicare coverage policy and payment limitations in setting their own reimbursement policies, but they also have their own methods and approval process apart from Medicare coverage and reimbursement determinations. Accordingly, one third-party payor's determination to provide coverage for a product does not assure that other payors will also provide coverage for the product.

Accordingly, the coverage determination process is often a time-consuming and costly process that will require us to provide scientific and clinical support for the use of our products to each payor separately, with no assurance that coverage and adequate reimbursement will be applied consistently or granted at all. The process for determining whether a payor will cover and how much it will reimburse a product may be separate from the process of seeking approval of the product or for setting the price of the product. Even if reimbursement is provided, market acceptance of our products may be adversely affected if the amount of payment for our products proves to be unprofitable for health care providers or less profitable than alternative treatments or if administrative burdens make our products less desirable to use.

Additionally, the United States government, state legislatures and foreign governments have shown significant interest in implementing cost containment programs to limit the growth of government-paid health care costs,

including price controls, restrictions on reimbursement and requirements for substitution of generic products for branded prescription drugs. For example, the ACA contains provisions that may reduce the profitability of drug products through increased rebates for drugs reimbursed by Medicaid programs, extension of Medicaid rebates to Medicaid managed care plans, mandatory discounts for certain Medicare Part D beneficiaries and annual fees based on pharmaceutical companies' share of sales to federal health care programs. Adoption of general controls and measures, coupled with the tightening of restrictive policies in jurisdictions with existing controls and measures, could limit payments for pharmaceutical drugs. The Medicaid Drug Rebate Program requires pharmaceutical manufacturers to enter into and have in effect a national rebate agreement with the Secretary of the Department of Health and Human Services as a condition for states to receive federal matching funds for the manufacturer's outpatient drugs furnished to Medicaid patients. The ACA made several changes to the Medicaid Drug Rebate Program, including increasing pharmaceutical manufacturers' rebate liability by raising the minimum basic Medicaid rebate on most branded prescription drugs from 15.1% of average manufacturer price, or AMP, to 23.1% of AMP and adding a new rebate calculation for "line extensions" (i.e., new formulations, such as extended release formulations) of solid oral dosage forms of branded products, as well as potentially impacting their rebate liability by modifying the statutory definition of AMP. The ACA also expanded the universe of Medicaid utilization subject to drug rebates by requiring pharmaceutical manufacturers to pay rebates on Medicaid managed care utilization and by enlarging the population potentially eligible for Medicaid drug benefits. As another example, the 2021 Consolidated Appropriations Act signed into law on December 27, 2020 incorporated extensive healthcare provisions and amendments to existing laws, including a requirement that all manufacturers of drugs and biological products covered under Medicare Part B report the product's average sales price ("ASP"), to the DHHS beginning on January 1, 2022, subject to enforcement via civil money penalties.

Since its enactment, there have been judicial and Congressional challenges to certain aspects of the ACA, and as a result certain sections of the ACA have not been fully implemented or effectively repealed. On June 17, 2021, the U.S. Supreme Court dismissed the most recent judicial challenge to the ACA brought by several states without specifically ruling on the constitutionality of the ACA. In addition, various legislative changes have been proposed and adopted since the ACA was enacted. These changes include aggregate reductions to Medicare payments to providers of up to 2% per fiscal year pursuant to the Budget Control Act of 2011, which began in 2013 and will remain in effect through 2030 unless additional Congressional action is taken, with the exception of a temporary suspension by Congress of the 2% cut in Medicare payments from May 1, 2020 through June 30, 2022 (a 1% sequester will apply from April 1, 2022 through June 30, 2022) due to the COVID-19 pandemic. In January 2013, the American Taxpayer Relief Act of 2012 was signed into law, which, among other things, further reduced Medicare payments to several providers, including hospitals, imaging centers and cancer treatment centers, and increased the statute of limitations period for the government to recover overpayments to providers from three to five years.

The Medicare Prescription Drug, Improvement, and Modernization Act of 2003, or the MMA, established the Medicare Part D program to provide a voluntary prescription drug benefit to Medicare beneficiaries. Under Part D, Medicare beneficiaries may enroll in prescription drug plans offered by private entities that provide coverage of outpatient prescription drugs. Unlike Medicare Part A and B, Part D coverage is not standardized. While all Medicare drug plans must give at least a standard level of coverage set by Medicare, Part D prescription drug plan sponsors are not required to pay for all covered Part D drugs, and each drug plan can develop its own drug formulary that identifies which drugs it will cover and at what tier or level. However, Part D prescription drug formularies must include drugs within each therapeutic category and class of covered Part D drugs, though not necessarily all the drugs in each category or class. Any formulary used by a Part D prescription drug plan must be developed and reviewed by a pharmacy and therapeutic committee. Government payment for some of the costs of prescription drugs may increase demand for products for which we receive marketing approval. However, any negotiated prices for our products covered by a Part D prescription drug plan likely will be lower than the prices we might otherwise obtain. Moreover, while the MMA applies only to drug benefits for Medicare beneficiaries, private payors often follow Medicare coverage policy and payment limitations in setting their own payment rates. Any reduction in payment that results from the MMA may result in a similar reduction in payments from non-governmental payors.

For a drug product to receive federal reimbursement under the Medicaid or Medicare Part B programs or to be sold directly to U.S. government agencies, the manufacturer must extend discounts to entities eligible to participate in the 340B drug pricing program. The maximum amount that a manufacturer may charge a 340B covered entity for a

given product is the AMP reduced by the rebate amount paid by the manufacturer to Medicaid for each unit of that product. As of 2010, the ACA expanded the types of entities eligible to receive discounted 340B pricing, although, under the current state of the law, with the exception of children's hospitals, these newly eligible entities will not be eligible to receive discounted 340B pricing on orphan drugs. In addition, as 340B drug pricing is determined based on AMP and Medicaid rebate data, the revisions to the Medicaid rebate formula and AMP definition described above could cause the required 340B discount to increase.

Moreover, there has been heightened governmental scrutiny over the manner in which manufacturers set prices for their marketed products, which has resulted in several Congressional inquiries and proposed and enacted federal and state legislation designed to, among other things, bring more transparency to product pricing, review the relationship between pricing and manufacturer patient programs, and reform government program reimbursement methodologies for drug products. For example, the 2021 Consolidated Appropriations Act signed into law on December 27, 2020 incorporated extensive healthcare provisions and amendments to existing laws, including new requirements for (1) all manufacturers of drugs and biological products covered under Medicare Part B to report the product's average sales price ("ASP"), to the DHHS beginning on January 1, 2022, subject to enforcement via civil money penalties, (2) certain Medicare plans to develop tools to display Medicare Part D prescription drug benefit information in real time, and (3) for group and health insurance issuers to report information on pharmacy benefit and drug costs to the Secretaries of Health and Human Services, Labor and the Treasury.

In addition, the Biden Administration, has indicated that lowering prescription drug prices is a priority. For example, in July 2021, President Biden issued a sweeping executive order on promoting competition in the American economy that includes several mandates pertaining to the pharmaceutical and health care insurance industries. Among other things, the executive order directs the FDA to work towards implementing a system for importing drugs from Canada (following on a Trump administration notice-and-comment rulemaking on Canadian drug importation that was finalized in October 2020). The Biden order also called on HHS to release a comprehensive plan to combat high prescription drug prices, and it includes several directives regarding the Federal Trade Commission's oversight of potentially anticompetitive practices within the pharmaceutical industry. The drug pricing plan released by HHS in September 2021 in response to the executive order makes clear that the Biden Administration supports aggressive action to address rising drug prices, including allowing HHS to negotiate the cost of Medicare Part B and D drugs, but such significant changes will require either new legislation to be passed by Congress or time-consuming administrative actions. Any future measures will require authorization through additional legislation or regulation to become effective, and it is uncertain whether Congress or the new Biden administration will seek new legislative and/or administrative measures to control drug costs.

At the state level, legislatures have increasingly passed legislation and implemented regulations designed to control pharmaceutical and biological product pricing, including price or patient reimbursement constraints, discounts, restrictions on certain product access and marketing cost disclosure and transparency measures, and, in some cases, designed to encourage importation from other countries and bulk purchasing. We expect that federal, state and local governments in the United States will continue to consider legislation directed at lowering the total cost of health care. In December 2020, the U.S. Supreme Court held unanimously that federal law does not preempt the states' ability to regulate pharmaceutical benefit managers ("PBMs") and other members of the health care and pharmaceutical supply chain, an important decision that may lead to further and more aggressive efforts by states in this area. As noted above, the marketability of any products for which we receive regulatory approval for commercial sale may suffer if the government and third-party payors fail to provide adequate coverage and reimbursement. An increasing emphasis on cost containment measures in the United States has increased and we expect will continue to increase the pressure on pharmaceutical pricing. Coverage policies and third-party reimbursement rates may change at any time. Even if favorable coverage and reimbursement status is attained for one or more products for which we receive regulatory approval, less favorable coverage policies and reimbursement rates may be implemented in the future.

In some foreign countries, proposed pricing for a drug must be approved before the product may be lawfully marketed. The requirements governing drug pricing vary widely from country to country. Some countries provide that drug products may be marketed only after agreement on a reimbursement price has been reached. Some countries may require additional studies that compare the cost-effectiveness of our product candidate to currently available therapies (so called health technology assessment, or HTA) in order to obtain reimbursement or pricing approval. For example, the European Union provides options for its member states to restrict the range of medicinal

products for which their national health insurance systems provide reimbursement and to control the prices of medicines. A member state may approve a specific price for the product or it may instead adopt a system of direct or indirect controls on the profitability of the company placing the product on the market. Other member states allow companies to fix their own drug prices but monitor and control prescription volumes and issue guidance to physicians to limit prescriptions. There can be no assurance that any country that has price controls or reimbursement limitations for pharmaceutical products will allow favorable reimbursement and pricing arrangements for any of our products. Historically, products launched in the European Union do not follow price structures of the United States and generally tend to be priced significantly lower.

Foreign Regulation

In addition to regulations in the United States, we are and will be subject, either directly or through our distribution partners, to a variety of regulations in other jurisdictions governing, among other things, clinical trials and commercial sales and distribution of our products, if approved in such jurisdiction.

Whether or not we obtain FDA approval for a product, we must obtain the requisite approvals from regulatory authorities in non-U.S. countries prior to the commencement of clinical trials or marketing of the product in those countries. The time required to obtain approval in other countries and jurisdictions might differ from and be longer than that required to obtain FDA approval. Regulatory approval in one country or jurisdiction does not ensure regulatory approval in another, but a failure or delay in obtaining regulatory approval in one country or jurisdiction may negatively impact the regulatory process in others.

Certain countries outside of the United States have processes that require the submission of a clinical trial application much like an IND prior to the commencement of human clinical trials. In Europe, for example, a clinical trial application, or CTA, must be submitted to the competent national health authority and to independent ethics committees in each country in which a company plans to conduct clinical trials. Once the CTA is approved in accordance with a country's requirements, clinical trials may proceed in that country.

Under the EU's new Clinical Trials Regulation, which took effect in January 2022, there will be a centralized application procedure where one EU Member State's competent authority takes the lead in reviewing part I of the application, which contains scientific and medicinal product documentation, and the other national authorities only have limited involvement. Part II, which contains the national and patient-level documentation, will be assessed individually by each EU Member State. Any substantial changes to the trial protocol or other information submitted with the CTA must be notified to or approved by the relevant competent authorities and ethics committees. Medicines used in clinical trials must be manufactured in accordance with good manufacturing practices. Other national and EU-wide regulatory requirements may also apply.

The requirements and processes governing the conduct of clinical trials, product licensing, pricing and reimbursement in Europe vary from country to country, even though there is already some degree of legal harmonization in the E. member states resulting from the national implementation of underlying EU legislation. In all cases, the clinical trials are conducted in accordance with GCP and other applicable regulatory requirements. To obtain regulatory approval of a new drug or medicinal product in the EU, a sponsor must obtain approval of a marketing authorization application. The way in which a medicinal product can be approved in the EU depends on the nature of the medicinal product.

The centralized procedure results in a single marketing authorization granted by the European Commission that is valid across the European Union, as well as in Iceland, Liechtenstein and Norway. The centralized procedure is compulsory for human drugs that are: (i) derived from biotechnology processes, such as genetic engineering, (ii) contain a new active substance indicated for the treatment of certain diseases, such as HIV/AIDS, cancer, diabetes, neurodegenerative diseases, autoimmune and other immune dysfunctions and viral diseases, (iii) officially designated as “orphan drugs” and (iv) advanced-therapy medicines, such as gene-therapy, somatic cell-therapy or tissue-engineered medicines. The centralized procedure may at the request of the applicant also be used for human drugs which do not fall within the above mentioned categories if (a) the human drug contains a new active substance which was not authorized in the European Community before May 20, 2004; or (b) the applicant shows that the medicinal product constitutes a significant therapeutic, scientific or technical innovation or that the granting of authorization in the centralized procedure is in the interests of patients or animal health at the European Community level.

Under the centralized procedure in the European Union, the maximum timeframe for the evaluation of a marketing authorization application by the EMA is 210 days (excluding clock stops, when additional written or oral information is to be provided by the applicant in response to questions asked by the Committee for Medicinal Products for Human Use, or CHMP), with adoption of the actual marketing authorization by the European Commission thereafter. Accelerated evaluation might be granted by the CHMP in exceptional cases, when a medicinal product is expected to be of a major public health interest from the point of view of therapeutic innovation, defined by three cumulative criteria: the seriousness of the disease to be treated; the absence of an appropriate alternative therapeutic approach, and anticipation of exceptional high therapeutic benefit. In this circumstance, EMA ensures that the evaluation for the opinion of the CHMP is completed within 150 days, excluding clock stops, and the opinion issued thereafter.

There are also two other possible routes to authorize medicinal products in several EU countries, which are available for investigational medicinal products for which the centralized procedure is not obligatory: the decentralized procedure and the mutual recognition procedure, or MRP. Using the decentralized procedure, an applicant may apply for simultaneous authorization in more than one EU country of medicinal products that have not yet been authorized in any EU country and that do not fall within the mandatory scope of the centralized procedure.

The MRP is applicable to the majority of conventional medicinal products, and is based on the principle of recognition of an already existing national marketing authorization by one or more member states. The characteristic of the MRP is that the procedure builds on an already existing marketing authorization in an EU member state which is used as reference in order to obtain marketing authorizations in other EU member states. In the MRP, a marketing authorization for a drug already exists in one or more member states of the EU and subsequently marketing authorization applications are made in other EU member states by referring to the initial marketing authorization. The member state in which the marketing authorization was first granted will then act as the reference member state. The member states where the marketing authorization is subsequently applied for act as concerned member states.

The MRP is based on the principle of the mutual recognition by EU member states of their respective national marketing authorizations. Based on a marketing authorization in the reference member state, the applicant may apply for marketing authorizations in other member states. In such case, the reference member state shall update its existing assessment report about the drug in 90 days. After the assessment is completed, copies of the report are sent to all member states, together with the approved summary of product characteristics, labeling and package leaflet. The concerned member states then have 90 days to recognize the decision of the reference member state and the summary of product characteristics, labeling and package leaflet. National marketing authorizations shall be granted within 30 days after acknowledgement of the agreement.

Should any Member State refuse to recognize the marketing authorization by the reference member state, on the grounds of potential serious risk to public health, the issue will be referred to a coordination group. Within a timeframe of 60 days, member states shall, within the coordination group, make all efforts to reach a consensus. If this fails, the procedure is submitted to an EMA scientific committee for arbitration. The opinion of this EMA Committee is then forwarded to the Commission, for the start of the decision-making process. As in the centralized procedure, this process entails consulting various European Commission Directorates General and the Standing Committee on Human Medicinal Products or Veterinary Medicinal Products, as appropriate.

In the EU, new chemical entities, sometimes referred to as new active substances, qualify for eight years of data exclusivity upon marketing authorization and an additional two years of market exclusivity. The data exclusivity, if granted, prevents regulatory authorities in the EU from referencing the innovator's data to assess a generic or biosimilar application for eight years, after which generic marketing authorization can be submitted, and the innovator's data may be referenced, but not approved for two years. The overall ten-year period can be extended to a maximum of 11 years if, during the first eight years of those ten years, the marketing authorization holder obtains an authorization for one or more new therapeutic indications which, during the scientific evaluation prior to their authorization, are determined to bring a significant clinical benefit in comparison with currently approved therapies.

The criteria for designating an orphan medicinal product in the European Union are similar in principle to those in the United States. Under Article 3 of Regulation (EC) 141/2000, a medicinal product may be designated as orphan if (1) it is intended for the diagnosis, prevention or treatment of a life-threatening or chronically debilitating condition; (2) either (a) such condition affects no more than five in 10,000 persons in the European Union when the application is made, or (b) the product, without the benefits derived from orphan status, would not generate sufficient return in the European Union to justify investment; and (3) there exists no satisfactory method of diagnosis, prevention or treatment of such condition authorized for marketing in the European Union, or if such a method exists, the product will be of significant benefit to those affected by the condition, as defined in Regulation (EC) 847/2000. Orphan medicinal products are eligible for financial incentives such as reduction of fees or fee waivers and are, upon grant of a marketing authorization, entitled to ten years of market exclusivity for the approved therapeutic indication. The application for orphan designation must be submitted before the application for marketing authorization. The applicant will receive a fee reduction for the marketing authorization application if the orphan designation has been granted, but not if the designation is still pending at the time the marketing authorization is submitted. Orphan designation does not convey any advantage in, or shorten the duration of, the regulatory review and approval process.

The ten-year market exclusivity for orphan products in the European Union may be reduced to six years if, at the end of the fifth year, it is established that the product no longer meets the criteria for orphan designation, for example, if the product is sufficiently profitable not to justify maintenance of market exclusivity. Additionally, marketing authorization may be granted to a similar product for the same indication at any time if:

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

We have obtained Orphan Medicinal Product Designations from the EMA for GPS in AML, MPM and MM.

For other countries outside of the United States and the European Union, such as countries in Eastern Europe, Latin America or Asia, the requirements governing the conduct of clinical trials, product licensing, pricing and reimbursement vary from country to country. In all cases, again, the clinical trials are conducted in accordance with GCP and the other applicable regulatory requirements.

If we fail to comply with applicable foreign regulatory requirements, we may be subject to, among other things, fines, suspension of clinical trials, suspension or withdrawal of regulatory approvals, product recalls, seizure of products, operating restrictions and criminal prosecution.

Health Care Reform in the U.S. and Potential Changes to Health Care Laws

FDA and other regulatory authority policies may change and additional government regulations may be enacted that could prevent, limit or delay regulatory approval of our drug candidates. For example in August 2017, the FDA Reauthorization Act was signed into law, which reauthorized the FDA's user fee programs and included additional drug and device provisions that build on the Cures Act enacted in December 2016. The next cycle of Congressional reauthorization for FDA's prescription drug, biologic, and medical device user fee programs must be completed by mid-2022 and that periodic must-pass legislation is typically used as a vehicle to implement federal policy changes or other substantive amendments to the FDCA. If we are slow or unable to adapt to changes in existing requirements or the adoption of new requirements or policies, or if we are not able to maintain regulatory compliance, we may lose any marketing approval that we otherwise may have obtained and we may not achieve or sustain profitability, which would adversely affect our business, prospects, financial condition and results of operations.

As previously mentioned, the primary trend in the US health care industry and elsewhere is cost containment. Government authorities and other third-party payors have attempted to control costs by limiting coverage and the amount of reimbursement for particular medical products and services, implementing reductions in Medicare and other health care funding and applying new payment methodologies. In addition to the sweeping reforms contained in the ACA (summarized above in the section entitled "Coverage and Reimbursement"), other legislative changes have been proposed and adopted in the United States that may affect health care expenditures. For example, the 2020 Further Consolidated Appropriations Act (P.L. 116-94) included a piece of bipartisan legislation called the Creating and Restoring Equal Access to Equivalent Samples Act of 2019 or the "CREATES Act." The CREATES Act aims to address the concern articulated by both the FDA and others in the industry that some brand manufacturers have improperly restricted the distribution of their products, including by invoking the existence of a REMS for certain products, to deny generic and biosimilar product developers access to samples of brand products. Because generic and biosimilar product developers need samples to conduct certain comparative testing required by the FDA, some have attributed the inability to timely obtain samples as a cause of delay in the entry of generic and biosimilar products. To remedy this concern, the CREATES Act establishes a private cause of action that permits a generic or biosimilar product developer to sue the brand manufacturer to compel it to furnish the necessary samples on "commercially reasonable, market-based terms." Whether and how generic and biosimilar product developments will use this new pathway, as well as the likely outcome of any legal challenges to provisions of the CREATES Act, remain highly uncertain and its potential effects on our future commercial products are unknown. The Consolidated Appropriations Act of 2021 also includes, among other things, a new requirement for patent information to be submitted to the FDA and published in a "Purple Book" that contains detailed information about each FDA-licensed biological product, analogous to the Orange Book that provides information about approved small-molecule drug products and their patent and exclusivity information under the Hatch-Waxman Amendments.

We cannot predict the likelihood, nature or extent of government regulation that may arise from future legislation or administrative or executive action, either in the United States or abroad. We expect that additional state and federal health care reform measures will be adopted in the future, any of which could limit the amounts that federal and state governments will pay for health care products and services. Moreover, if we are slow or unable to adapt to changes in existing requirements or the adoption of new requirements or policies, or if we are not able to maintain regulatory compliance, our therapeutic candidates may lose any marketing approval that may have been obtained and we may not achieve or sustain profitability, which would adversely affect our business.

Corporate Information

Our principal executive offices are located at 7 Times Square, Suite 2503, New York, NY 10036, and our phone number is (646) 200-5278. Our website address is www.sellaslifesciences.com. We do not incorporate the information on our website into this annual report on Form 10-K, and you should not consider such information part of this annual report on Form 10-K.

We were incorporated on April 3, 2006 in Delaware as Argonaut Pharmaceuticals, Inc. On November 28, 2006, we changed our name to RXi Pharmaceuticals Corporation and began operations January 2007. On September 26, 2011, we changed our name to Galena Biopharma, Inc., or Galena. In December 2017, we completed the Merger with Private SELLAS and changed our name to "SELLAS Life Sciences Group, Inc."

A copy of our Corporate Governance Guidelines, Code of Business Conduct and Ethics and the charters of the Audit Committee, Compensation Committee and Nominating and Corporate Governance Committee are posted on our website, www.sellaslifesciences.com, under "Investors – Corporate Governance."

ITEM 1A. RISK FACTORS

You should carefully consider the risks and uncertainties described below, together with all of the other information in this annual report on Form 10-K. We operate in a dynamic and rapidly changing industry that involves numerous risks and uncertainties. The risks and uncertainties described below are not the only ones we face. Other risks and uncertainties, including those that we do not currently consider material, may impair our business. If any of the risks discussed below actually occur, our business, financial condition, operating results or cash flows could be materially adversely affected. This annual report on Form 10-K also contains forward-looking statements that involve risks and uncertainties. Our actual results could differ materially from those anticipated in these forward-looking statements as a result of certain factors, including the risks we face as described below and elsewhere in this annual report on Form 10-K.

Risks Related to Our Financial Position and Capital Needs

We have incurred substantial losses since our inception and anticipate that we will continue to incur substantial and increasing losses for the foreseeable future.

Investment in biopharmaceutical product development is highly speculative because it entails substantial upfront capital expenditures and significant risk that a product candidate will fail to prove effective, gain regulatory approval or become commercially viable. We do not have any products approved by regulatory authorities, have not generated any revenues to date, and have incurred significant research, development and other expenses related to our ongoing operations. As a result, we have not been profitable and have incurred significant operating losses in every reporting period since our inception. For the years ended December 31, 2021 and 2020, we reported a net loss of $20.7 million and $16.8 million, respectively. As of December 31, 2021 and 2020, we had an accumulated deficit of $138.6 million and $117.9 million, respectively.

We do not expect to generate revenues for many years, if at all. We expect to continue to incur significant expenses and operating losses for the foreseeable future. We anticipate these losses to increase as we continue to research, develop and seek regulatory approvals for our product candidates and any additional product candidates we may acquire, and potentially begin to commercialize product candidates that may achieve regulatory approval. We may also encounter unforeseen expenses, difficulties, complications, delays and other unknown factors that may adversely affect our business. The size of our future net losses will depend, in part, on the rate of future growth of our expenses and our ability to generate revenues. Our expenses will further increase as we:

- conduct additional clinical trials of our lead product, GPS, including the Phase 3 clinical trial evaluating GPS for AML;
- hire additional personnel, including clinical, manufacturing, quality control, quality assurance and other scientific personnel, sales and marketing personnel and general and administrative personnel;

- seek marketing approval for any product candidates that successfully complete clinical trials;
- develop our outsourced manufacturing and commercial activities and establish sales, marketing and distribution capabilities, if we receive, or expect to receive, marketing approval for any product candidates;
- in-license or acquire the rights to, and pursue development of, other products, product candidates or technologies;
- maintain, expand and protect our intellectual property portfolio; and
- add operational, financial and management information systems and personnel.

We currently have no source of revenues from product sales. We may never generate such revenues or achieve profitability.

Currently, we do not generate any revenues from product sales or otherwise. Even if we are able to successfully achieve regulatory approval for our product candidates, we do not know when we will generate revenues or become profitable, if at all. Our ability to generate revenues from product sales and achieve profitability will depend on our ability to successfully commercialize products, including our current product candidates, and other product candidates that we may develop, in-license or acquire in the future. Our ability to generate revenues and achieve profitability also depends on a number of additional factors, including our ability to:

- successfully complete development activities, including the necessary clinical trials;
- complete and submit BLAs to the FDA and obtain U.S. regulatory approval for indications for which there is a commercial market;
- complete and submit applications to foreign regulatory authorities in Europe, Asia and other jurisdictions;
- obtain regulatory approval in territories with viable market sizes;
- obtain coverage and adequate reimbursement from third parties, including government and private payors;
- set commercially viable prices for our products, if any;
- establish and maintain supply and manufacturing relationships with reliable third parties and/or build our own manufacturing facility and ensure adequate, legally globally compliant manufacturing of bulk drug substances and drug products to maintain that supply;
- develop distribution processes for our product candidates;
- develop commercial quantities of our product candidates, once approved, at acceptable cost levels; obtain additional funding, if required to develop and commercialize our product candidates;
- develop a commercial organization capable of sales, marketing and distribution for any products we intend to sell ourselves, in the markets in which we choose to commercialize on our own;
- achieve market acceptance of our products;
- attract, hire and retain qualified personnel; and
- protect our rights in our intellectual property portfolio.

Our revenues for any product candidate for which regulatory approval is obtained will be dependent, in part, upon the size of the markets in the territories for which it gains regulatory approval, the accepted price for the product, the ability to get reimbursement at any price, and whether we own the commercial rights for that territory. If the number of our addressable disease patients is not as significant as our estimates, the indication approved by regulatory authorities is narrower than we expect, or the reasonably accepted population for treatment is narrowed by competition, physician choice or treatment guidelines, we may not generate significant revenues from sales of such products, even if approved. In addition, we anticipate incurring significant costs associated with commercializing any approved product candidate. As a result, even if we generate revenues, we may not become profitable and may need to obtain additional funding to continue operations. If we fail to become profitable or are unable to sustain profitability on a continuing basis, then we may be unable to continue our operations at planned levels and may be forced to reduce our operations.

We will need additional financing to fund our operations and complete the development and, if approved, the commercialization of our product candidates. If we are unable to raise capital when needed, we could be forced to delay, reduce or eliminate our product development programs or commercialization efforts.

We expect to expend substantial resources for the foreseeable future to continue the clinical development and manufacturing of GPS, in particular the Phase 3 study of GPS in AML. Our existing cash will not be sufficient to complete such development activities and obtain regulatory approval for GPS and, if we receive regulatory approval for GPS, commence commercialization activities, and we will need to raise significant additional capital to help us do so. In addition, our operating plan may change as a result of factors currently unknown to us, and we may need additional funds sooner than planned. If we are unable to obtain sufficient funding for our operations, we may be delayed in pursuing our development program for GPS.

Our future capital requirements depend on many factors, including:

- the scope, progress, results and costs of our ongoing and planned development programs for our product candidates, as well as any additional clinical trials we undertake to obtain data sufficient to seek marketing approval for our product candidates in any indication;
- the timing of, and the costs involved in, obtaining regulatory approvals for our product candidates if our clinical trials are successful;
- the cost of commercialization activities for our product candidates, if any of these product candidates are approved for sale, including marketing, sales and distribution costs;
- the cost of manufacturing our product candidates for clinical trials in preparation for regulatory approval, including the cost and timing of process development, manufacturing scale-up and validation activities;
- our ability to establish and maintain strategic licensing or other arrangements and the financial terms of such agreements;
- the costs to in-license future product candidates or technologies;
- the costs involved in preparing, filing, prosecuting, maintaining, expanding, defending and enforcing patent claims, including litigation costs and the outcome of such litigation;
- the costs in defending and resolving future derivative and securities class action litigation;
- our operating expenses; and
- the emergence of competing technologies or other adverse market developments.

Additional funds may not be available when we need them on terms that are acceptable to us, or at all. We have no committed source of additional capital. Moreover, global events, such as the coronavirus pandemic and geopolitical unrest, have caused and will likely continue to cause uncertainty and volatility in the capital markets which could impact our ability to raise capital. If adequate funds are not available to us on a timely basis, we may not be able to continue as a going concern or we may be required to delay, limit, reduce or terminate preclinical studies, clinical trials or other development activities for one or more of our product candidates or target indications, 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.

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

We may seek additional capital through a variety of means, including through private and public equity offerings and debt financings, collaborations, strategic alliances and marketing, distribution or licensing arrangements. To the extent that we raise additional capital through the sale of equity or convertible debt securities, or through the issuance of shares under management or other types of contracts, or upon the exercise or conversion of outstanding derivative securities, the ownership interests of our stockholders will be diluted, and the terms of such financings may include liquidation or other preferences, anti-dilution rights, conversion and exercise price adjustments and other provisions that adversely affect the rights of our stockholders, including rights, preferences and privileges that are senior to those of our holders of common stock in the event of a liquidation. In such event, there is a possibility that once all senior claims are settled, there may be no assets remaining to pay out to the holders of our common stock. Debt financing, if available, could include covenants limiting or restricting our ability to take certain actions, such as incurring additional debt, making capital expenditures, entering into licensing arrangements, or declaring dividends and may require us to grant security interests in our assets, including our intellectual property, and for our subsidiaries to guarantee our obligations. If we are unable to raise additional funds through equity or debt financings when needed, we may be required to grant rights to develop and market products or product candidates that we would otherwise prefer to develop and market ourselves. If we raise additional funds through collaborations, strategic alliances, or marketing, distribution or licensing arrangements with third parties, we may have to relinquish valuable rights to our technologies, future revenue streams, products or product candidates or grant licenses on terms that may not be favorable to us.

Our cash and cash equivalents balance as of December 31, 2021 will fund our operations for less than one year.

As of December 31, 2021, we had a cash and cash equivalents balance of approximately $21.4 million. We expect our existing cash and cash equivalents balance as of December 31, 2021, will be insufficient to fund current planned operations for at least the next twelve months from the date of issuance of our consolidated financial statements for the year ended December 31, 2021, and that we will need to raise additional capital in order to continue our operations as currently planned. In the event that we are unable to obtain additional financing, we may be unable to continue as a going concern. There is no guarantee that we will be able to secure additional financing. Changes in our operating plans, our existing and anticipated working capital needs, the acceleration or modification of our development activities, any near-term or future expansion plans, increased expenses, potential acquisitions or other events may further affect our ability to continue as a going concern. See Note 2 to our consolidated financial statements included elsewhere in this Annual Report on Form 10-K for additional information on our assessment. Similarly, the report of our independent registered public accounting firm on our consolidated financial statements as of and for the year ended December 31, 2021 includes an Emphasis of Matter paragraph indicating that there is substantial doubt about our ability to continue as a going concern. Our consolidated financial statements do not include any adjustments that might result from the outcome of this uncertainty. If we cannot continue as a viable entity, our securityholders may lose some or all of their investment in us.

Risks Related to the Development and Regulatory Approval of Our Product Candidates

Clinical-stage biopharmaceutical companies with product candidates in clinical development face a wide range of challenging activities which may entail substantial risk.

The success of our product candidates will depend on several factors, including the following:

- designing, conducting and successfully completing preclinical development activities, including preclinical efficacy and IND-enabling studies, for our product candidates or product candidates we are interested in in-licensing or acquiring;
- designing, conducting and completing clinical trials for our product candidates with positive results;
- receipt of regulatory approvals from applicable authorities;

- obtaining and maintaining patent and trade secret protection and regulatory exclusivity for our product candidates;
- making arrangements with third-party manufacturers, receiving regulatory approval of our manufacturing processes and our third-party manufacturers' facilities from applicable regulatory authorities and ensuring adequate supply of drug product;
- manufacturing our product candidates at an acceptable cost;
- effectively launching commercial sales of our product candidates, if approved, whether alone or in collaboration with others;
- achieving acceptance of our product candidates, if approved, by patients, the medical community and third-party payors;
- effectively competing with other therapies;
- if our products candidates are approved, obtaining and maintaining coverage and adequate reimbursement by third-party payors, including government payors, for our product candidates;
- complying with all applicable regulatory requirements, including FDA current Good Clinical Practices, or cGCP, current Good Manufacturing Practices, or cGMP, and standards, rules and regulations governing promotional and other marketing activities;
- maintaining a continued acceptable safety profile of the products during development and following approval; and
- maintaining and growing an organization of scientists and business people who can develop and commercialize our product candidates.

If we do not achieve one or more of these factors in a timely manner or at all, we could experience significant delays or an inability to successfully develop and commercialize our product candidates, which could materially harm our business.

Our lead product candidate, GPS, represents a new therapeutic approach that presents significant challenges.

Our future success is substantially dependent on the successful development of WT1 peptide immunotherapies in general and GPS in particular. Because this program represents a new approach to cancer immunotherapy for the treatment of cancer and other diseases, developing and commercializing GPS subjects us to a number of challenges, including:

- obtaining regulatory approval from the FDA and other regulatory authorities, which have very limited experience with the development and commercialization of WT1 cancer immunotherapies;
- obtaining the components required for the administration of GPS (i.e., GPS, GM-CSF, and Montanide) from three separate sources, the subsequent separate storage requirements for each of these components and the delivery of these components to the administration location;
- utilizing GPS in combination with other therapies, which may increase the risk of adverse side effects;
- sourcing clinical and, if approved, commercial supplies for the materials used to manufacture and process GPS;
- developing a manufacturing process used in connection with GPS that will yield a satisfactory product that is safe, effective, scalable and profitable;

- establishing sales and marketing capabilities after obtaining any regulatory approval to gain market acceptance; and
- obtaining coverage and adequate reimbursement from third-party payors and government authorities.

Moreover, public perception of safety issues, including adoption of new therapeutics or novel approaches to treatment, may adversely influence the willingness of subjects to participate in clinical trials, or if approved, of physicians to subscribe to the novel treatment mechanics. Physicians, hospitals and third-party payors often are slow to adopt new products, technologies and treatment practices that require additional educational upfront costs and training. Physicians may not be willing to undergo training to adopt this novel therapy, may decide the therapy is too complex to adopt without appropriate training and may choose not to administer the therapy. Based on these and other factors, hospitals and payors may decide that the benefits of this new therapy do not or will not outweigh their costs.

The impact of Covid-19, as well as the limited number of patients who have the diseases for which our product candidates are being studied, has made it more difficult to enroll patients in our clinical trials, which could delay or prevent the start of clinical trials for our product candidates.

Identifying and qualifying patients to participate in clinical trials of our current and future product candidates is essential to our success. The timing of our clinical trials depends in part on the rate at which we can recruit patients to participate in clinical trials of our product candidates, and we may experience delays in our clinical trials if we encounter difficulties in enrollment. If we experience delays in our clinical trials, the timeline for obtaining regulatory approval of our product candidates will most likely be delayed.

Many factors may affect our ability to identify, enroll and maintain qualified patients, including the following:

- disruptions caused by the global COVID-19 pandemic;
- shortages of personnel at our clinical sites;
- travel restrictions, lockdowns, and social distancing requirements as a result of COVID-19 which can adversely affect clinical site monitoring;
- eligibility criteria of our ongoing and planned clinical trials with specific characteristics appropriate for inclusion in our clinical trials;
- design of the clinical trial;
- size and nature of the patient population;
- patients' perceptions as to risks and benefits of the product candidate under study and the participation in a clinical trial generally in relation to other available therapies, including any new drugs that may be approved for the indications we are investigating;
- the availability and efficacy of competing therapies and clinical trials;
- pendency of other trials underway in the same patient population;
- willingness of physicians to participate in our planned clinical trials;
- severity of the disease under investigation;
- proximity of patients to clinical sites;
- patients who do not complete the trials for personal reasons; and
- issues with contract research organizations, or CROs, and/or with other vendors that handle our clinical trials.

For example, we have observed that, at certain times and in certain instances, clinical site initiations and patient enrollment may have been delayed due to prioritization of hospital resources towards the COVID-19 pandemic and staff shortages at our clinical sites. Clinicians and patients may not have been able to comply with clinical trial protocols if quarantines impeded patient movement or interrupted operations at sites. Certain newly initiated sites have taken longer than expected to be fully operational. Additionally, several countries in which we currently have or plan to have clinical sites continue to impose restrictions in response to the continued surge in coronavirus cases. We believe that these factors have had and could continue to have an impact on the projected timelines for enrollment of patients in the REGAL study.

Moreover, the indication being studied in our Phase 3 clinical trial for GPS, i.e., patients with AML who have achieved CR2, is an orphan indication. In addition, only those CR2 patients who meet specific inclusion criteria are eligible to participate in the study. Primary entry restrictions include demonstrating adequate hematologic recovery, not being candidates for bone marrow transplants and not being eligible for treatments targeted at certain mutations common in significant proportions of AML patients. The estimated prevalence of newly diagnosed AML patients is approximately 20,000 cases in the United States annually (across all ages) with only a subset of this group having achieved CR2 and only a further subset of the CR2 subset satisfying the enrollment criteria for our AML Phase 3 clinical trial.

We may not be able to initiate or continue to support clinical trials of our product candidates for one or more indications, or any future product candidates if we are unable to locate and enroll a sufficient number of eligible participants in these trials as required by the FDA or other regulatory authorities. Even if we are able to enroll a sufficient number of patients in our clinical trials, if the pace of enrollment is slower than we expect, the development costs for our product candidates may increase and the completion of our trials may be delayed or our trials could become too expensive to complete.

If we experience delays in the completion of, or termination of, any clinical trials of our current or future product candidates, the commercial prospects of our product candidates could be harmed, and our ability to generate product revenue from any of these product candidates could be delayed or prevented. In addition, any delays in completing our clinical trials would likely increase our overall costs, impair product candidate development and jeopardize our ability to obtain regulatory approval relative to our current plans. Any of these occurrences may harm our business, financial condition, and prospects significantly.

The results of preclinical studies or earlier clinical trials are not necessarily predictive of future results. Our existing product candidates in clinical trials, and any other product candidates that may advance into clinical trials, may not have favorable results in later clinical trials or receive regulatory approval.

Success in preclinical studies and early clinical trials does not ensure that later clinical trials will generate adequate data to demonstrate the efficacy and safety of an investigational drug. A number of companies in the pharmaceutical and biotechnology industries, including those with greater resources and experience than us, have suffered significant setbacks in clinical trials, even after seeing promising results in earlier preclinical studies or clinical trials. Any of our product candidates that are in, or may advance to, clinical trials may not succeed in clinical trials despite promising preclinical data. For example, with respect to GPS, a broadly similar anti-cancer peptide immunotherapeutic against melanoma-specific antigen being developed by GlaxoSmithKline for advanced unresectable melanoma initially produced positive efficacy data in a Phase 2 clinical study, but subsequently failed to prove more beneficial than placebo in a controlled, blinded and randomized Phase 3, registration-enabling clinical trial in the same indication in patients after tumor resection.

Despite the results reported in earlier preclinical studies or clinical trials for our product candidates, we do not know whether the clinical trials we may conduct will demonstrate adequate efficacy and safety to result in regulatory approval to market GPS or any of our product candidates for a particular indication, either as a monotherapy or in combination, in any particular jurisdiction. Efficacy data from prospectively designed trials may differ significantly from those obtained from retrospective subgroup analyses. If later-stage clinical trials do not produce favorable results, our ability to achieve regulatory approval for GPS may be adversely impacted. Even if we believe that we have adequate data to support an application for regulatory approval to market any of our current or future product candidates, the FDA or other regulatory authorities may not agree and may require that we conduct additional clinical trials.

Clinical drug development involves a lengthy and expensive process with an uncertain outcome.

Clinical testing is expensive and can take many years to complete, with the outcome inherently uncertain. Failure can occur at any time during the clinical trial process. Before obtaining approval from regulatory authorities for the sale of any product candidate, we must conduct extensive clinical trials to demonstrate the safety and efficacy of our product candidates in humans. Prior to initiating clinical trials, a sponsor must complete extensive preclinical testing of a product candidate, including, in most cases, preclinical efficacy experiments as well IND-enabling toxicology studies. These experiments and studies may be time-consuming and expensive to complete. The necessary preclinical testing may not be completed successfully for a preclinical product candidate and a potentially promising product candidate may therefore never be tested in humans. Once it commences, clinical testing is expensive, difficult to design and implement, can take many years to complete and is uncertain as to outcome. A failure of one or more clinical trials can occur at any stage of testing. The outcome of preclinical testing and early clinical trials may not be predictive of the success of later clinical trials, and interim results of a clinical trial do not necessarily predict final results. Moreover, preclinical and clinical data are often susceptible to varying interpretations and analyses, and many companies that have believed their product candidates performed satisfactorily in preclinical studies and clinical trials have nonetheless failed to obtain marketing approval of their products. We may experience numerous unforeseen events during drug development that could delay or prevent our ability to receive marketing approval or commercialize our product candidates. In particular, clinical trials of our product candidates may produce inconclusive or negative results. We have limited data regarding the safety, tolerability and efficacy of GPS administered as monotherapy or in combination with PD-1 inhibitors. For a further discussion of the safety risks in our trials, see the risk factor herein entitled "Our current and future product candidates, the methods used to deliver them or their dosage levels may cause undesirable side effects or have other properties that could delay or prevent their regulatory approval, limit the commercial profile of an approved label or result in significant negative consequences following any regulatory approval."

Clinical trials also require the review and oversight of an IRB. An inability or delay in obtaining IRB approval could prevent or delay the initiation and completion of clinical trials, and the FDA may decide not to consider any data or information derived from a clinical investigation not subject to initial and continuing IRB review and approval.

We may experience delays in our ongoing or future clinical trials, and we do not know whether planned clinical trials will begin or enroll subjects on time, will need to be redesigned or will be completed on schedule, if at all. There can be no assurance that the FDA will not put clinical trials of any of our product candidates on clinical hold in the future. Clinical trials may be delayed, suspended or prematurely terminated for a variety of reasons, such as:

- delay or failure in reaching agreement with the FDA or a comparable foreign regulatory authority on a clinical trial design that we are able to execute;
- delay or failure in obtaining authorization to commence a trial or inability to comply with conditions imposed by a regulatory authority regarding the scope or design of a trial;
- delay or failure in reaching agreement on acceptable terms with prospective contract research organizations, or CROs, and clinical trial sites, the terms of which can be subject to extensive negotiation and may vary significantly among different CROs and trial sites;
- delay or failure in obtaining IRB approval or the approval of other reviewing entities, including comparable foreign regulatory authorities, to conduct a clinical trial at each site;
- withdrawal of clinical trial sites from our clinical trials or the ineligibility of a site to participate in our clinical trials;
- the impact of COVID-19 on the operations of clinical sites;
- clinical sites and investigators deviating from trial protocol, failing to conduct the trial in accordance with regulatory requirements, or dropping out of a trial;
- inability to identify and maintain a sufficient number of trial sites, many of which may already be engaged in other clinical trial programs, including some that may be for the same indication;

- failure of our third-party clinical trial managers, CROs, clinical trial sites, contracted laboratories or other third-party vendors to satisfy their contractual duties, meet expected deadlines or return trustworthy data;
- delay or failure in adding new trial sites;
- delay or failure in recruiting and enrolling suitable subjects to participate in a trial;
- delay or failure in subjects completing a trial or returning for post-treatment follow-up;
- interim results or data that are ambiguous or negative or are inconsistent with earlier results or data;
- alteration of trial design necessitated by re-evaluation of design assumptions based upon observed data;
- feedback from the FDA, the IRB, DSMB or a comparable foreign regulatory authority, or results from earlier stage or concurrent preclinical studies and clinical trials, that might require modification to the protocol for a trial;
- a decision by the FDA, the IRB, a comparable foreign regulatory authority, or us, or a recommendation by a DSMB or comparable foreign regulatory authority, to suspend or terminate clinical trials at any time for safety issues or for any other reason;
- unacceptable risk-benefit profile, unforeseen safety issues or adverse side effects;
- failure to demonstrate a benefit from using a product candidate;
- difficulties in manufacturing or obtaining from third parties sufficient quantities of a product candidate to start or to use in clinical trials;
- lack of adequate funding to continue a trial, including the incurrence of unforeseen costs due to enrollment delays, requirements to conduct additional studies or increased expenses associated with the services of our CROs and other third parties; or
- changes in governmental regulations or administrative actions or lack of adequate funding to continue a clinical trial.

If we experience delays in the completion or termination of any clinical trial of our product candidates, the approval and commercial prospects of such product candidates will be harmed, delaying our ability to generate product revenues from such product candidate and our costs will most likely increase. The required regulatory approvals may also be delayed, thereby jeopardizing our ability to commence product sales and generate revenues and the period of commercial exclusivity for our products may be decreased. Regulatory approval of our product candidates may be denied for the same reasons that caused the delay.

Risks associated with operating in foreign countries could materially adversely affect our product development.

We are conducting future studies in countries outside of the United States. Consequently, we may be subject to risks related to operating in foreign countries. Risks associated with conducting operations in foreign countries include:

- differing regulatory requirements for drug approvals and regulation of approved drugs in foreign countries; more stringent privacy requirements for data to be supplied to our operations in the United States, *e.g.*, GDPR the in the European Union;
- unexpected changes in tariffs, trade barriers and regulatory requirements; economic weakness, including inflation, or political instability in particular foreign economies and markets; compliance with tax, employment, immigration and labor laws for employees living or traveling abroad; foreign taxes, including withholding of payroll taxes;

- differing payor reimbursement regimes, governmental payors or patient self-pay systems and price controls;
- foreign currency fluctuations, which could result in increased operating expenses or reduced revenues, and other obligations incident to doing business or operating in another country;
- workforce uncertainty in countries where labor unrest is more common than in the United States;
- continued uncertainties related to the withdrawal of the United Kingdom from the European Union (known as "Brexit") and its financial, trade, regulatory and legal implications, which could lead to legal uncertainty and potentially divergent national laws and regulations as the United Kingdom determines which EU laws to replace or replicate, and which may further create global economic uncertainty, which could materially adversely affect our business, business opportunities, results of operations, financial condition, and cash flows;
- the COVID-19 pandemic, which has resulted in global travel restrictions;
- production shortages resulting from any events affecting raw material supply or manufacturing capabilities abroad, including those that may result from the recent coronavirus outbreak; and
- business interruptions resulting from geopolitical actions, including war and terrorism.

Global, market and economic conditions may negatively impact our business, financial condition and share price.

We face several risks associated with international business and are subject to global events beyond our control, including war, public health crises, such as pandemics and epidemics, trade disputes, economic sanctions, trade wars and their collateral impacts and other international events. We are currently operating in a period of economic uncertainty and capital markets disruption, which has been significantly impacted by geopolitical instability due to the ongoing armed military conflict between Russia and Ukraine. Our business, financial condition and results of operations may be materially adversely affected by any negative impact on the global economy and capital markets resulting from the conflict in Ukraine or any other geopolitical tensions.

The U.S., United Kingdom and EU governments, among others, have instituted various sanctions and export-control measures in response to the invasion, including comprehensive financial sanctions, targeted at Russia or designated individuals and entities with business interests and/or government connections to Russia or those involved in Russian military activities. Governments have also enhanced export controls and trade sanctions targeting Russia’s imports of goods. The United States and other countries could impose wider sanctions and take other actions should the conflict further escalate. It is not possible to predict the broader consequences of this conflict, which could include further sanctions, embargoes, regional instability, geopolitical shifts and adverse effects on macroeconomic conditions, currency exchange rates and financial markets, all of which could impact our business, financial condition and results of operations and our ability to raise capital.

Although we do not currently have any clinical study sites in Russia or Ukraine, economic, political and social conditions resulting from Russia’s invasion of Ukraine could materially disrupt our clinical trials, increase our costs and may disrupt planned clinical development activities. For example, we are currently in the process of activating clinical sites for our REGAL study in Poland, a country that borders Ukraine and is being impacted by an influx of Ukrainian refugees resulting from Russia’s invasion of Ukraine. Furthermore, we rely on suppliers in the EU. To the extent the conflict between Ukraine and Russia adversely impacts the ability of our suppliers to distribute the supplies we need for our clinical trials, or such distribution cannot be done on a timely basis, the timing for completing our clinical trials may be adversely impacted.

Our current and future product candidates, the methods used to deliver them or their dosage levels may cause undesirable side effects or have other properties that could delay or prevent their regulatory approval, limit the commercial profile of an approved label or result in significant negative consequences following any regulatory approval.

Undesirable side effects caused by our current or future product candidates, their delivery methods or dosage levels could cause us or regulatory authorities to interrupt, delay or halt clinical trials and could result in a more restrictive label or the delay or denial of regulatory approval or termination of clinical trials by the FDA or other comparable foreign regulatory authority; an independent DSMB that is governing our clinical trials; or an IRB, that approves and, monitors biomedical research to protect the rights and welfare of human subjects. For example, although no high-grade delayed type hypersensitivity in the skin or systemic anaphylaxis events have been noted after GPS administration in patients treated in our clinical studies to date, it is theoretically possible that such toxicities, or other type of adverse events, may occur in future clinical studies. As a result of safety or toxicity issues that we may experience in our clinical trials, or negative or inconclusive results from the clinical trials of others for drug candidates similar to our own, we may not receive approval to market any product candidates, which could prevent us from ever generating revenues or achieving profitability. Results of our trials could reveal an unacceptably high severity and incidence of side effects. In such an event, our trials could be suspended or terminated, and the FDA or comparable foreign regulatory authorities could order us to cease further development of or deny approval of our product candidates for any or all targeted indications. The drug-related side effects could also affect patient recruitment or the ability of enrolled subjects to complete the trial or result in potential product liability claims. Any of these occurrences may have a material adverse effect on our business, results of operations, financial condition, cash flows and future prospects.

Additionally, if any of our product candidates receives regulatory approval, and we or others later identify undesirable side effects caused by such product, a number of potentially significant negative consequences could result, including that:

- we may be forced to suspend marketing of such product;
- regulatory authorities may withdraw their approvals of such product;
- regulatory authorities may require additional warnings on the label that could diminish the usage or otherwise limit the commercial success of such products;
- we may be required to conduct post-marketing studies;
- we may be required to change or the healthcare setting in which the way the product is administered;
- we could be sued and held liable for harm caused to subjects or patients; and
- our reputation may suffer.

Any of these events could prevent us from achieving or maintaining market acceptance of the particular product candidate, if approved.

Our product development program may not uncover all possible adverse events that patients who take our product candidates may experience. The number of subjects exposed to product candidates and the average exposure time in the clinical development program may be inadequate to detect rare adverse events or chance findings that may only be detected once the product is administered to more patients and for greater periods of time.

Clinical trials by their nature utilize a sample of the potential patient population. However, with a limited number of subjects and limited duration of exposure, we cannot be fully assured that rare and severe side effects of our product candidates will be uncovered. Such rare and severe side effects may only be uncovered with a significantly larger number of patients exposed to our product candidates. If such safety problems occur or are identified after our product candidates reaches the market, the FDA may require that we amend the labeling of the product or recall the product, or may even withdraw approval for the product, any of which could subject us to substantial product liability claims and related litigation.

Our future success is dependent on the regulatory approval of our product candidates.

Our business is dependent on our ability to obtain regulatory approval for our product candidates in a timely manner. We cannot commercialize product candidates in the United States without first obtaining regulatory approval for the product from the FDA. Similarly, we cannot commercialize product candidates outside of the United States without obtaining regulatory approval from comparable foreign regulatory authorities. Before obtaining regulatory approvals for the commercial sale of any product candidate for a target indication, we must demonstrate with substantial evidence gathered in preclinical studies and clinical trials, generally including well-controlled Phase 3 trials, that the product candidate is safe and effective for use for that target indication and that the manufacturing facilities, processes and controls are adequate with respect to such product candidate.

The time required to obtain approval by the FDA and comparable foreign regulatory authorities is unpredictable but typically takes many years following the commencement of preclinical studies and clinical trials and depends upon numerous factors, including the substantial discretion and available resources of the regulatory authorities. In addition, approval policies, regulations, or the type and amount of clinical data necessary to gain approval may change during the course of a product candidate's clinical development and may vary among jurisdictions.

Even if a product candidate were to successfully obtain approval from the FDA and comparable foreign regulatory authorities, any approval might contain significant limitations related to use restrictions for specified age groups, warnings, precautions or contraindications, or may be subject to burdensome post-approval study or risk management requirements. Also, any regulatory approval of our current or future product candidates, once obtained, may be withdrawn.

Our current and future product candidates could fail to receive regulatory approval from the FDA.

We have not obtained regulatory approval for any product candidate and it is possible that our existing product candidates or any future product candidates will not obtain regulatory approval, for many reasons, including:

- disagreement with the regulatory authorities regarding the scope, design or implementation of our clinical trials;
- failure to demonstrate that a product candidate is safe and effective for our proposed indication;
- failure of clinical trials to meet the level of statistical significance required for approval;
- failure to demonstrate that a product candidate's clinical and other benefits outweigh its safety risks;
- disagreement with our interpretation of data from preclinical studies or clinical trials;
- the insufficiency of data collected from clinical trials of our product candidates to support the submission and filing of a BLA, NDA or other submission or to obtain regulatory approval;

- the insufficiency of a single Phase 3 clinical trial of GPS in AML for regulatory approval in that indication;
- failure to obtain approval of our manufacturing processes or facilities of third-party manufacturers with whom we contract for clinical and commercial supplies or our own manufacturing facility; or
- changes in the approval policies or regulations that render our preclinical and clinical data insufficient for approval.

The FDA or a comparable foreign regulatory authority may require more information, including additional preclinical or clinical data to support approval or additional studies, which may delay or prevent approval and our commercialization plans, or we may decide to abandon the development program. If we were to obtain approval, regulatory authorities may approve any of our product candidates for fewer or more limited indications than we request (including failing to approve the most commercially promising indications), may grant approval contingent on the performance of costly post-marketing clinical trials, or may approve a product candidate with a label that does not include the labeling claims necessary or desirable for the successful commercialization of that product candidate.

If we are unable to obtain regulatory approval for one of our product candidates in one or more jurisdictions, or any approval contains significant limitations, we may not be able to obtain sufficient funding to continue the development of that product or generate revenues attributable to that product candidate.

We currently have Orphan Drug Product designation for certain product candidates, and may seek Orphan Drug Product designation for additional product candidates or indications, which might not be received or provide the intended benefit thereof.

Regulatory authorities in some jurisdictions, including the United States and Europe, may designate drugs for relatively small patient populations as Orphan Drug Products. Under the Orphan Drug Act, the FDA may designate a product as an Orphan Drug Product if it is a drug intended to treat a rare disease or condition, which is generally defined as a patient population of fewer than 200,000 individuals annually in the United States. We have received Orphan Drug Product designations from the FDA for GPS in AML, MPM and MM as well as Orphan Medicinal Product designations from the EMA for GPS in AML, MPM and MM. Although we have received Orphan Drug Product designation for GPS, there is no guarantee that any of these indications for GPS will be successfully approved by the FDA or the EMA, that GPS will be commercially successful in the marketplace, or that another product will not be approved for the same indication ahead of our product candidate.

Even if we obtain Orphan Drug Product exclusivity for a product, that exclusivity may not effectively protect the product from competition because different drugs can be approved for the same condition. Even after an Orphan Drug Product is approved, the FDA can subsequently approve another drug for the same condition if the FDA concludes that the later drug is clinically superior in that it is shown to be safer, more effective or makes a major contribution to patient care. In addition, Orphan Drug Product exclusivity may be lost if the FDA or EMA determines that the request for designation was materially defective or if the manufacturer is unable to assure sufficient quantity of the drug to meet the needs of patients with the rare disease or condition.

We currently have Fast Track designation for certain product candidates and may seek Fast Track designation for additional product candidates or indications, which might not be received or provide the intended benefits thereof.

If a product candidate is intended for the treatment of a serious condition and nonclinical or clinical data demonstrate the potential to address unmet medical need for this condition, a product sponsor may apply to the FDA for Fast Track designation, which may or may not be granted by the FDA. The FDA has given us Fast Track designation for GPS in AML, MPM and MM and for NPS for the adjuvant treatment of patients with early stage breast cancer with low to intermediate HER2 expression following standard of care upfront therapy (surgery plus chemotherapy +/- radiotherapy).

However, Fast Track designation does not ensure that we will receive marketing approval or that approval will be granted within any particular timeframe. We may not experience a faster development or regulatory review or approval process with Fast Track designation compared to conventional FDA procedures. In addition, the FDA may withdraw Fast Track designation if it believes that the designation is no longer supported by data from our clinical development program. Fast Track designation alone does not guarantee qualification for the FDA's priority review procedures.

Failure to obtain regulatory approval in international jurisdictions would prevent our product candidates from being marketed abroad.

In addition to regulations in the United States, to market and sell our product candidates in the European Union, United Kingdom, many Asian countries and other jurisdictions, we must obtain separate regulatory approvals and comply with numerous and varying regulatory requirements. Approval by the FDA does not ensure approval by regulatory authorities in other countries or jurisdictions, and approval by one regulatory authority outside the United States does not ensure approval by regulatory authorities in other countries or jurisdictions or by the FDA. The regulatory approval process outside the United States generally includes all of the risks associated with obtaining FDA approval as well as risks attributable to the satisfaction of local regulations in foreign jurisdictions. The approval procedure varies among countries and can involve additional testing. The time required to obtain approval may differ substantially from that required to obtain FDA approval. We may not be able to obtain approvals from regulatory authorities outside the United States on a timely basis, if at all. Clinical trials accepted in one country may not be accepted by regulatory authorities in other countries. In addition, many countries outside the United States require that a product be approved for reimbursement before it can be approved for sale in that country. A product candidate that has been approved for sale in a particular country may not receive reimbursement approval in that country, or may receive reimbursement at a level that is not commercially viable.

We may not be able to file for regulatory approvals and may not receive necessary approvals to commercialize our products in any market. If we are unable to obtain approval of any of our current or future product candidates by regulatory authorities in the European Union, United Kingdom, Asia or elsewhere, the commercial prospects of that product candidate may be significantly diminished, our business prospects could decline and this could materially adversely affect our business, results of operations and financial condition.

Even if our current and future product candidates receive regulatory approval, they may still face future development and regulatory difficulties.

Any regulatory approvals we receive for any of our product candidates may be subject to limitations on the approved indicated uses for which the product candidate may be marketed or to the conditions of approval, or contain requirements for potentially costly post-marketing testing, including Phase 4 clinical trials. In addition. Any such regulatory approvals would be subject to ongoing requirements by the FDA and comparable foreign regulatory authorities governing the manufacture, quality control, further development, labeling, packaging, storage, distribution, adverse event reporting, safety surveillance, import, export, advertising, promotion, recordkeeping and reporting of safety and other post-marketing information. These requirements include submissions of safety and other post-marketing information and reports, registration, as well as continued compliance by us and/or our contract manufacturing organizations, or CMOs, and CROs for any post-approval clinical trials that we may conduct. The safety profile of any product will continue to be closely monitored by the FDA and comparable foreign regulatory authorities after approval. If the FDA or comparable foreign regulatory authorities become aware of new safety information after approval of any of our product candidates, they may require labeling changes or establishment of a risk evaluation and mitigation strategy, impose significant restrictions on a product's indicated uses or marketing or impose ongoing requirements for potentially costly post-approval studies or post-market surveillance. Any new legislation addressing drug safety issues could result in delays in product development or commercialization, or increased costs to assure compliance. If our original marketing approval for a product candidate was obtained through an accelerated approval pathway, we could be required to conduct a successful post-marketing clinical trial to confirm the clinical benefit for our products. An unsuccessful post-marketing clinical trial or failure to complete such a trial could result in the withdrawal of marketing approval.

In addition, manufacturers and manufacturers' facilities are required to continuously comply with FDA and comparable foreign regulatory authority requirements, including ensuring quality control and manufacturing procedures conform to cGMP, regulations and corresponding foreign regulatory manufacturing requirements. Accordingly, we and our contract manufacturers will be subject to continual review and inspections to assess compliance with cGMP and adherence to commitments made in any BLA submission to the FDA or any other type of domestic or foreign marketing authorization application. We or our third-party manufacturers may not be able to comply with cGMP regulations or similar regulatory requirements outside of the United States. If any of our third-party suppliers fails to comply with cGMP or other applicable manufacturing regulations, our ability to develop and commercialize our product candidates could suffer significant interruptions. If we or a regulatory agency discover previously unknown problems with a product, such as adverse events of unanticipated severity or frequency, or problems with the facility where the product is manufactured, a regulatory agency may impose restrictions on that product, the manufacturing facility or us, including requiring recall or withdrawal of the product from the market or suspension of manufacturing. If we, our product candidates or the manufacturing facilities for our product candidates fail to comply with applicable regulatory requirements, a regulatory agency may take the following actions, any of which could significantly and adversely affect supplies of our products:

- issue Form 483 notices of observations, warning letters or untitled letters;
- mandate modifications to promotional materials or require us to provide corrective information to healthcare practitioners;
- require us to enter into a consent decree, which can include imposition of various fines, reimbursements for inspection costs, required due dates for specific actions and penalties for noncompliance;
- seek an injunction or impose civil or criminal penalties or monetary fines;
- suspend or withdraw regulatory approval;
- suspend any ongoing clinical trials;
- refuse to approve pending applications or supplements to applications filed by us;
- suspend or impose restrictions on operations, including costly new manufacturing requirements; or
- seize or detain products, refuse to permit the import or export of products, or require us to initiate a product recall.

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

Advertising and promotion of any product candidate that obtains approval in the United States will be heavily scrutinized by the FDA, the DOJ, the Office of Inspector General of the U.S. Department of Health and Human Services, or HHS, state attorneys general, members of Congress and the public. A company can make only those claims relating to safety and efficacy, purity and potency that are approved by the FDA and in accordance with the provisions of the approved label. Additionally, advertising and promotion of any product candidate that obtains approval outside of the United States will be heavily scrutinized by comparable foreign regulatory authorities. Violations, including actual or alleged promotion of our products for unapproved or off-label uses, are subject to enforcement letters, inquiries and investigations, and civil and criminal sanctions by the FDA, as well as prosecution under the federal False Claims Act. Any actual or alleged failure to comply with labeling and promotion requirements may have a negative impact on our business.

Risks Related to Our Manufacturing

We have limited to no manufacturing or distribution capability and must rely upon third parties for such.

We currently have agreements with various third-party manufacturing facilities for production of our product candidates for research and development and testing purposes. We depend on these manufacturers to meet our deadlines, quality standards and specifications. Reliance on third-party providers may expose us to more risk than if we were to manufacture our product candidates ourselves. We do not control the manufacturing processes of the CMOs we contract with and are dependent on those third parties for the production of our product candidates in accordance with relevant applicable regulations, such as cGMP, which includes, among other things, quality control, quality assurance and the maintenance of records and documentation. Our reliance on third parties for the manufacture of our active pharmaceutical ingredient and drug product and, in the future, any approved products, creates a dependency that could severely disrupt our research and development, our clinical testing, and ultimately our sales and marketing efforts if the source of such supply proves to be unreliable or unavailable. If the contracted manufacturing source is unreliable or unavailable, we may not be able to manufacture clinical drug supplies of our product candidates, and our preclinical and clinical testing programs may not be able to move forward and our entire business plan could fail.

Our third-party manufacturers are subject to inspection and approval by regulatory authorities before we can commence the manufacture and sale of any of our product candidates, and thereafter are subject to ongoing inspection from time to time. Our third-party manufacturers may not be able to comply with cGMP regulations or similar regulatory requirements outside of the United States. In complying with the manufacturing regulations of the FDA and other comparable foreign regulatory authorities, we and our third-party suppliers must spend significant time, money and effort in the areas of design and development, testing, production, record-keeping and quality control to assure that the products meet applicable specifications and other regulatory requirements. If either we or our CMOs fail to comply with these requirements, our ability to develop and commercialize our product candidates could suffer significant interruptions, and we may be subject to regulatory enforcement action, including the seizure of products and shutting down of production.

Both the active pharmaceutical ingredient and drug product for our product candidates are currently single sourced. We believe these single sources are currently capable of supplying all anticipated needs of our proposed clinical studies, as well as initial commercial introduction. If we are able to commercialize our products in the future, there is no assurance that our manufacturers will be able to meet commercialized scale production requirements in a timely manner or in accordance with applicable standards or cGMP. Once the nature and scope of additional indications and their commensurate drug product demands are established, we will seek secondary suppliers of both the active pharmaceutical ingredient and drug product for our product candidates, but we cannot assure that such secondary suppliers will be found on terms acceptable to us, or in a timely manner, or at all.

We are subject to a multitude of manufacturing risks, any of which could substantially increase our costs and limit supply of our product candidates.

We and our CMOs will need to conduct significant development work for each product candidate for each target indication for studies, trials and commercial launch readiness. We intend to improve the existing processes for GPS in connection with more advanced clinical trials or commercialization efforts we may undertake in the future. Developing commercially viable manufacturing processes is a difficult, expensive and uncertain task, and there are risks associated with scaling to the level required for advanced clinical trials or commercialization, including cost overruns, potential problems with process scale-up, process reproducibility, stability issues, storage issues, consistency and timely availability of reagents or raw materials. The manufacturing facilities in which our product candidates will be made could be adversely affected by the recent coronavirus outbreak, other pandemics, earthquakes and other natural disasters, equipment failures, labor shortages, lack of adequate temperature controls, power failures, and numerous other factors. We currently estimate that we have sufficient clinical supplies to support our clinical trials for at least the next 12 months, however, this estimate is dependent on patient enrollment rates and a number of other factors and, accordingly, could change. Moreover, current clinical supplies may not be adequate for future clinical studies.

Additionally, the process of manufacturing our product candidates is complex, highly regulated and subject to several risks, including but not limited to:

- product loss due to contamination, equipment failure or improper installation or operation of equipment, or vendor or operator error;
- product loss or manufacturing failure due to failure of temperature controls in production, storage or transit;
- product loss, which may not be covered by insurance, due to global conflict and unrest, including related inoperability of shipping lanes;
- reduced production yields, product defects, and other supply disruptions due to deviations, even minor, from normal manufacturing and distribution processes;
- unexpected product defects;
- microbial, viral, or other contaminations in our product candidates or in the manufacturing facilities in which our product candidates are made, which may result in the closure of such manufacturing facilities for an extended period of time to allow for the investigation and remediation of the contamination;
- adverse impact on the active ingredient of GPS as a result of potential contamination from the presence of heavy metals which can lead to higher than acceptable rates of impurities resulting in the active ingredient being unacceptable for use; and
- adverse impact on the manufacturing of GPS as a result of potential contamination from excess water and oxygen which can lead to higher than acceptable levels of impurities resulting in the drug product being unacceptable for use.

Any adverse developments affecting manufacturing operations for our product candidates may result in shipment delays, inventory shortages, lot failures, withdrawals or recalls or other interruptions in the supply of our drug substance and drug product, which could delay the development of our product candidates. We may also have to write off inventory, incur other charges and expenses for supply of drug product that fails to meet specifications, undertake costly remediation efforts, or seek more costly manufacturing alternatives. Inability to meet the demand for our product candidates could damage our reputation and the reputation of our products among physicians, healthcare payors, patients or the medical community, and cancer treatment centers, which could adversely affect our ability to operate our business and our results of operations.

In the clinical trials using GPS and NPS, GM-CSF is also administered and its availability is dependent upon a third-party manufacturer, which may or may not reliably provide GM-CSF, thus jeopardizing the completion of the trials.

Both GPS and NPS are administered in combination with GM-CSF, which is available in both liquid and lyophilized forms exclusively from one manufacturer. We will continue to be dependent on that manufacturer for our supply of GM-CSF in connection with the ongoing GPS and NPS trials and the potential commercial manufacture of these programs. We have not entered into a dedicated supply agreement with the manufacturer for GM-CSF, and instead rely on purchase orders to meet our supply needs. Any temporary interruptions or discontinuation of the availability of GM-CSF, or any determination by us to change the GM-CSF used with GPS or NPS, could have a material adverse effect on our clinical trials and any commercialization of the assets. Similarly, for GPS, Montanide is also administered in combination with GM-CSF and GPS. Any temporary interruptions or discontinuation of the availability of Montanide could have a material adverse effect on our clinical trials for GPS and any commercialization of the asset.

If any of our CMOs' clinical manufacturing facilities are damaged or destroyed or production at such facilities is otherwise interrupted, our business and prospects would be negatively affected.

If our CMOs' manufacturing facilities or the equipment in them is damaged or destroyed, we may not be able, quickly or inexpensively, to replace our manufacturing capacity or replace it at all. In the event of a temporary or protracted loss of this facility or equipment, we might not be able to transfer manufacturing to another CMO. Even if we could transfer manufacturing to another CMO, the shift would likely be expensive and time-consuming, particularly because the new facility would need to comply with the necessary regulatory requirements, and we would need FDA approval before selling any products manufactured at that facility. Such an event could delay our clinical trials or reduce our product sales.

Although we currently maintain insurance coverage against damage to our property and to cover business interruption and research and development restoration expenses, our insurance coverage may not reimburse us, or may not be sufficient to reimburse us, for any expenses or losses we may suffer. In addition, our clinical trials insurance coverage has exclusions for global conflict and unrest or the type currently ongoing in Ukraine. We may be unable to meet our requirements for our product candidates if there were a catastrophic event or failure of our current manufacturing facility or processes.

Risks Related to Our Dependence on Third Parties and Our License Agreements

We rely on third parties to conduct our preclinical studies and clinical trials. If these third parties do not successfully carry out their contractual duties or meet expected deadlines, or if we lose any of our CROs or other key third-party vendors, we may not be able to obtain regulatory approval for or commercialize our current or future product candidates on a timely basis, if at all.

Our internal capacity for clinical trial execution and management is limited and therefore we rely heavily on third parties. We have relied upon and plan to continue to rely upon third-party CROs, vendors and contractors to monitor and manage data for our ongoing preclinical and clinical programs. We currently rely on and plan to continue to rely on a CRO for our Phase 3 trial for GPS in AML and well as all of our ongoing and contemplated clinical studies, with services to be rendered by such CROs and vendors ranging from specific and need-tailored (*e.g.*, data management and biostatistics) only to, in the case of our Phase 3 trial for GPS in AML, all-encompassing. We rely on these parties for the execution of our preclinical studies and clinical trials, including the proper and timely conduct of our clinical trials, and we control only some aspects of their activities. Outsourcing these functions involves risk that third parties may not perform to our standards, may not produce results or data in a timely manner or may fail to perform at all.

While we have agreements governing the commitments of our third-party vendor services, we have limited influence over their actual performance. Nevertheless, we are responsible for ensuring that each of our trials is conducted in accordance with the applicable protocol and legal, regulatory and scientific standards, and our reliance on the CROs does not relieve us of our regulatory responsibilities.

If our company, or any of our partners or CROs, fail to comply with applicable regulations and good clinical practices, the clinical data generated in our clinical trials may be deemed unreliable and the FDA or comparable foreign regulatory authorities may require us to perform additional clinical trials before approving our regulatory applications. Upon inspection by a given regulatory authority, such regulatory authority could determine that any of our clinical trials are not in compliance with applicable requirements. In addition, our clinical trials must be conducted with product produced under cGMP and other requirements. We are also required to register ongoing clinical trials and post the results of completed clinical trials on a government-sponsored database, clinicaltrials.gov, within a specified timeframe. Failure to comply also would violate federal requirements in the United States and could result in other penalties, which would delay the regulatory approval process and result in adverse publicity.

Our CROs, third-party vendors and contractors are not our employees, and except for remedies available to us under our agreements with such CROs, third-party vendors and contractors, we cannot control whether or not they devote sufficient time and resources, including experienced staff, to our ongoing clinical, nonclinical and preclinical programs. They may also have relationships with other entities, some of which may be our competitors. If CROs, third-party vendors and contractors do not successfully carry out their contractual duties or obligations or meet expected deadlines or if the quality or accuracy of the clinical data they obtain is compromised due to the failure to adhere to our clinical protocols, regulatory requirements or for other reasons, our clinical trials may be extended, delayed or terminated and we may not be able to obtain regulatory approval for or successfully commercialize our current or future product candidates. CRO, vendor or contractor errors could cause our results of operations and the commercial prospects for our current or future product candidates to be harmed, our costs to increase and our ability to generate revenues to be delayed.

In addition, the use of third-party service providers requires us to disclose our proprietary information to these parties, which could increase the risk that this information will be misappropriated. We currently have a small number of employees, which limits the internal resources we have available to identify and monitor our third-party providers. To the extent we are unable to identify and successfully manage the performance of third-party service providers in the future, our business may be adversely affected. Though we carefully manage our relationships with our CROs, there can be no assurance that we will not encounter challenges or delays in the future or that these delays or challenges will not have a material adverse impact on our business, financial condition and prospects.

If any of our relationships with our third-party CROs, third-party vendors or contractors terminate, we may not be able to enter into arrangements with alternative CROs, third-party vendors or contractors on a timely basis, on commercially reasonable terms or at all.

Our CROs, third-party vendors and contractors have the right to terminate their agreements with us in the event of an uncured material breach. In addition, some of our CROs, third-party vendors and contractors have an ability to terminate their respective agreements with us if it can be reasonably demonstrated that the safety of the subjects participating in our clinical trials warrants such termination, if we make a general assignment for the benefit of our creditors or if we are liquidated. Identifying, qualifying and managing performance of third-party service providers can be difficult, time consuming and cause delays in our development programs. In addition, there is a natural transition period when a new CRO, third-party vendor or contractor commences work and the new CRO, third-party vendor or contractor may not provide the same type or level of services as the original provider.

We are dependent on technologies we license, and if we lose the right to license such technologies or we fail to license new technologies in the future, our ability to develop new products would be harmed, and if we fail to meet our obligations under our license agreements, we may lose the ability to develop our product candidates.

We currently are dependent on licenses from third parties for technologies relating to our product candidates. Our current licenses impose, and any future licenses we enter into are likely to impose, various development, funding, royalty, diligence, sublicensing, insurance and other obligations on us. If our license with respect to any of these technologies is terminated for any reason, the development of the products contemplated by the licenses would be delayed, or suspended altogether, while we seek to license similar technology or develop new non-infringing technology. The costs of obtaining new licenses are high. For example, we are entirely dependent on our license from MSK to allow us to develop and commercialize our lead product candidate, GPS, and any loss of or challenge to our license agreement with MSK could have a material and adverse effect on our business and result of operations.

In addition, our business depends on our ability to license therapeutic compounds from third parties. If we fail to meet our obligations under our license agreements, we may lose the ability to develop our product candidates, which would adversely affect our business.

We have in-licensed a significant portion of our intellectual property from MSK. If we breach our license agreement with MSK, we could lose the ability to continue the development and potential commercialization of GPS.

GPS is licensed-in from MSK and includes an exclusive license to United States and foreign patent applications. Under the MSK license agreement, we are subject to various obligations, including diligence obligations with respect to funding, development and commercialization activities, payment obligations upon achievement of certain milestones and royalties on product sales, as well as other material obligations. If there is any conflict, dispute, disagreement or issue of nonperformance between us and MSK regarding our rights or obligations under the license agreements, including any such conflict, dispute or disagreement arising from our failure to satisfy diligence or payment obligations under any such agreement, we may be liable to pay damages and MSK may have a right to terminate the affected license. The loss of our license agreement with MSK could materially adversely affect our ability to proceed to utilize the affected intellectual property in our development efforts, our ability to enter into future collaboration, licensing and/or marketing agreements for GPS and our ability to commercialize GPS. The risks described elsewhere pertaining to our patents and other intellectual property rights also apply to the intellectual property rights that we license, and any failure by us or our licensors to obtain, maintain and enforce these rights could have a material adverse effect on our business.

To date, we have not been able to identify any suitable acquiror, licensing or collaboration partner for NPS to enter into a transaction with such acquiror or partner on favorable terms, and we may not be able to find such a suitable acquiror or partner in the future, which will impair our ability to derive value from the NPS asset.

We have determined that we will not engage in further development of NPS. As a result of such determination, the primary path available to derive value from the NPS asset is to find a suitable acquiror, licensing or collaboration partner for the asset. We currently have no agreements or commitments to engage in any specific transactions, and our exploration of various strategic alternatives has not resulted in any specific action or transaction. There can be no assurance that we will enter into any transaction as a result of this effort or that a transaction will be able to be consummated upon favorable terms, including up-front, milestone, royalty and/or license payments as a result of numerous factors, many of which are outside of our control. Furthermore, if we enter into a transaction relating to NPS, our business objectives may change depending upon the nature of the transaction. We cannot predict the impact that such transaction might have on our stock price. We also cannot predict the impact on our stock price if we fail to enter into such a transaction. If we do enter into a transaction to out-license NPS, there is no assurance that the licensee will be successful in the development and commercialization of the asset as any potential licensee would be subject to many of the same risks associated with clinical development set forth in this “Risk Factors” section.

We may not realize the benefits of our strategic alliances that we may form in the future.

We may form strategic alliances, create joint ventures or collaborations or enter into licensing arrangements with third parties that we believe will complement or augment our existing business, such as our License Agreement with 3D Medicines. These relationships, or those like them, may require us to incur nonrecurring and other charges, increase our near- and long-term expenditures, issue securities that dilute our existing stockholders or disrupt our management and business. In addition, we face significant competition in seeking appropriate strategic alliances and the negotiation process is time-consuming and complex. Moreover, we may not be successful in our efforts to establish a strategic alliance or other alternative arrangements for any future product candidates and programs because our research and development pipeline may be insufficient, our product candidates and programs may be deemed to be at too early a stage of development for collaborative effort and third parties may not view our product candidates and programs as having the requisite potential to demonstrate safety and efficacy. If we license products or acquire businesses, we may not be able to realize the benefit of such transactions if we are unable to successfully integrate them with our existing operations and company culture. We cannot be certain that, following a strategic transaction or license, we will achieve the revenues or specific net income that justifies such transaction. Any delays in entering into new strategic alliances or license agreements related to our product candidates could also delay the development and commercialization of our product candidates and reduce their competitiveness even if they reach the market.

Our business involves the use of hazardous materials and we and our third-party manufacturers and suppliers must comply with environmental, health and safety laws and regulations, which can be expensive and restrict how we do business.

Our third-party manufacturers' and suppliers' activities involve the controlled storage, use and disposal of hazardous materials. We and our manufacturers and suppliers are subject to laws and regulations governing the use, manufacture, storage, handling and disposal of these hazardous materials even after we sell or otherwise dispose of the products. In some cases, these hazardous materials and various wastes resulting from their use will be stored at our contractors or manufacturers' facilities pending use and disposal. We cannot completely eliminate the risk of contamination, which could cause injury to our employees and others, environmental damage resulting in costly cleanup and liabilities under applicable laws and regulations governing the use, storage, handling and disposal of these materials and specified waste products. Although we expect that the safety procedures utilized by our third-party contractors and manufacturers for handling and disposing of these materials will generally comply with the standards prescribed by these laws and regulations, we cannot guarantee that this will be the case or eliminate the risk of accidental contamination or injury from these materials. In such an event, we may be held liable for any resulting damages and such liability could exceed our resources. We do not currently carry biological or hazardous waste insurance coverage and our property and casualty, and general liability insurance policies specifically exclude coverage for damages and fines arising from biological or hazardous waste exposure or contamination.

We may not be able to establish or maintain the third-party relationships that are necessary to develop or potentially commercialize some or all of our product candidates.

We expect to depend on collaborators, partners, licensees, clinical research organizations and other third parties to support our discovery efforts, to formulate product candidates, to manufacture our product candidates, to conduct clinical trials for some or all of our product candidates and to commercialize our product candidates if approved. For example, in December 2020 we entered into an Exclusive License Agreement with 3D Medicines pursuant to which we granted commercialization rights in the Greater China Territory to 3D Medicines. We cannot guarantee that we will be able to successfully negotiate agreements for or maintain relationships with collaborators, partners, licensees, clinical investigators, vendors and other third parties on favorable terms, if at all. Our ability to successfully negotiate such agreements will depend on, among other things, potential partners' evaluation of the superiority of our technology over competing technologies and the quality of the preclinical and clinical data that we have generated, and the perceived risks specific to developing our product candidates. If we are unable to obtain or maintain these agreements, we may not be able to clinically develop, formulate, manufacture, obtain regulatory approvals for or commercialize our product candidates. We cannot necessarily control the amount or timing of resources that our contract partners, including 3D Medicines, will devote to our research and development programs, product candidates or potential product candidates, and we cannot guarantee that these parties will fulfill their obligations to us under these arrangements in a timely fashion, if at all. We may not be able to readily terminate any such agreements with contract partners even if such contract partners do not fulfill their obligations to us.

In addition, we may receive notices from third parties from time to time alleging that our technology or product candidates infringe upon the intellectual property rights of those third parties. Any assertion by third parties that our activities or product candidates infringe upon the intellectual property rights of third parties may adversely affect our ability to secure strategic partners or licensees for our technology or product candidates or our ability to secure or maintain manufacturers for our compounds.

Risks Related to Our Intellectual Property

We may not be able to obtain and enforce patent rights or other intellectual property rights that cover our product candidates and that are of sufficient breadth to prevent third parties from competing against us.

Our success with respect to our product candidates will depend in part on our ability to obtain and maintain patent protection in the United States and abroad, to preserve our trade secrets, and to prevent third parties from infringing upon our proprietary rights. We seek to protect our proprietary position by filing in the United States and in certain foreign jurisdictions patent applications related to our novel technologies and product candidates that are important to our business. The patent prosecution process is expensive and time-consuming, and we may not be able to file and prosecute all necessary or desirable patent applications at a reasonable cost or in a timely manner. It is also possible that we will fail to identify patentable aspects of our research and development output before it is too late to obtain patent protection. In addition, we may not pursue or obtain patent protection in all major markets. Moreover, in some circumstances, we do not have the right to control the preparation, filing or prosecution of patent applications, or to maintain the patents, covering technology that we license from third parties or covering technology that a collaboration or commercialization partner may develop. In some circumstances, our licensors have the right to prosecute and/or enforce the licensed patents without our involvement or consent, or to decide not to enforce or to allow us to enforce the licensed patents. Therefore, these patents and applications may not be prosecuted and enforced in a manner consistent with the best interests of our business. If any such licensors fail to maintain such patents, or lose rights to those patents, the rights that we have licensed may be reduced or eliminated and our ability to develop and commercialize any of our products that are the subject of such licensed rights could be adversely affected.

The patent position of biotechnology and pharmaceutical companies generally is highly uncertain, involves complex legal and factual questions and has in recent years been the subject of much litigation. In addition, the laws of foreign jurisdictions may not protect our rights to the same extent as the laws of the United States. For example, European patent law restricts the patentability of methods of treatment of the human body more than U.S. law does. Publications of discoveries in the scientific literature often lag behind the actual discoveries, and patent applications in the United States and other jurisdictions are typically not published until 18 months after filing, or in some cases not at all. Therefore, we cannot be certain that we or our licensors were the first to make the inventions claimed in our owned or licensed patents or pending patent applications, or that we or our licensors were the first to file for patent protection of such inventions. Moreover, the U.S. Patent and Trademark Office, or USPTO, might require that the term of a patent issuing from a pending patent application be disclaimed and limited to the term of another patent that is commonly owned or names a common inventor. As a result, the issuance, scope, validity, term, enforceability and commercial value of our patent rights are highly uncertain.

Our pending and future patent applications, and any collaboration or commercialization partner's pending and future patent applications, may not result in patents being issued which protect our technology or products, in whole or in part, or which effectively prevent others from commercializing competitive technologies and products.

During prosecution of any patent application, the issuance of any patents based on the application may depend upon our or our partners' ability to generate additional preclinical or clinical data that support the patentability of our proposed claims. We or any collaboration or commercialization partner may not be able to generate sufficient additional data on a timely basis, or at all. Moreover, changes in either the patent laws or interpretation of the patent laws in the United States or other countries may diminish the value of our or a collaboration or commercialization partner's patents or narrow the scope of our or their patent protection.

Changes in either the patent laws or in the interpretations of patent laws in the United States or abroad may diminish the value of our intellectual property.

On September 16, 2011, the Leahy-Smith America Invents Act, or the Leahy-Smith Act, was signed into law. The Leahy-Smith Act includes a number of significant changes to the U.S. patent law. These include provisions that affect the way patent applications will be prosecuted and may also affect patent litigation. Accordingly, it is not clear what, if any, impact the Leahy-Smith Act will have on the operation of our business. However, the Leahy-Smith Act, in particular the first-to-file provision and our implementation thereof, could increase the uncertainties and costs surrounding the prosecution of our patent applications and the enforcement or defense of our issued patents, all of which could have a material adverse effect on our business and financial condition. Accordingly, we cannot predict the breadth of claims that may be allowed or enforced in our patents or in third-party patents.

In addition, U.S. Supreme Court rulings have narrowed the scope of patent protection available in certain circumstances in certain situations. From time to time, the U.S. Supreme Court, other federal courts, the U.S. Congress, or interpretation by the USPTO may change the standards of patentability and any such changes could have a negative impact on our business.

Some cases decided by the U.S. Supreme Court have involved questions of when claims reciting abstract ideas, laws of nature, natural phenomena and/or natural products are eligible for a patent, regardless of whether the claimed subject matter is otherwise novel and inventive. These cases include *Association for Molecular Pathology v. Myriad Genetics, Inc.*, 569 U.S. 576 (2013), also known as the Myriad decision; *Alice Corp. v. CLS Bank International*, 573 U.S. 13-298 (2014), also known as the Alice decision; and *Mayo Collaborative Services v. Prometheus Laboratories, Inc.*, also known as the Prometheus decision, 566 U.S. 66 (2012). The full impact of these decisions is not yet known. In view of these and subsequent court decisions, the USPTO has issued materials to patent examiners providing guidance for determining the patent eligibility of claims reciting laws of nature, natural phenomena, or natural products.

Our current product candidates include products, or components, derived to various extents from nature; therefore, these decisions and their interpretation by the courts and the USPTO may impact prosecution, defense, and enforcement of certain types of patent claims in our patent portfolio. In addition to increasing uncertainty with regard to our ability to obtain future patents, this combination of events has created uncertainty with respect to the value of patents, once obtained. Depending on these and other decisions by U.S. Congress, the federal courts, and the USPTO, the laws and regulations governing patents could change or be interpreted in unpredictable ways that would weaken our ability to obtain some patent claims or to enforce patents that may issue to us in the future. In addition, these events may adversely affect our ability to defend patents that may issue in procedures in the USPTO or in U.S. courts.

While we intend to take actions reasonably necessary to enforce our patent rights, we may not be able to detect infringement of our own or in-licensed patents, which may be especially difficult for methods of manufacturing or formulation products.

We depend, in part, on our licensors and collaborators to protect a substantial portion of our proprietary rights. In addition, third parties may challenge our in-licensed patents and any of our own patents that we may obtain, which could result in the invalidation or unenforceability of some or all of the relevant patent claims. Litigation or other proceedings to enforce or defend intellectual property rights is very complex, expensive, and may divert our management's attention from our core business and may result in unfavorable results that could adversely affect our ability to prevent third parties from competing with us.

If another party has reason to assert a substantial new question of patentability against any of our claims in our own and in-licensed patents, the third party can request that the patent claims be reexamined, which may result in a loss of scope of some claims or a loss of the entire patent. In addition to potential infringement suits, and interference and reexamination proceedings, we may become a party to patent opposition proceedings where either the patentability of the inventions subject of our patents are challenged, or we are challenging the patents of others. The costs of these proceedings could be substantial, and it is possible that such efforts would be unsuccessful. As the medical device, biotechnology and pharmaceutical industries expand and more patents are issued, the risk increases that others may assert our commercial product and/or product candidates infringe their patent rights. If a third-party's patents were found to cover our commercial product and product candidates, proprietary technologies or our uses, we or our collaborators could be enjoined by a court and required to pay damages and could be unable to continue to commercialize our products or use our proprietary technologies unless we or such collaborators obtained a license to the patent. A license may not be available to us or our collaborators on acceptable terms, if at all. In addition, during litigation, the patent holder could obtain a preliminary injunction or other equitable relief, which could prohibit us from making, using or selling our commercial product and product candidates pending a trial on the merits, which could be years away.

Our product candidates may face biosimilar competition sooner than expected after the expiration of our composition of matter patent protection for such products.

Even if we are successful in achieving regulatory approval to commercialize a product candidate ahead of our competitors, our product candidates may face competition from biosimilar products. Most biological products are licensed for marketing by FDA via a BLA, under authorities in the Public Health Service Act, or PHSA. To obtain licensure or marketing approval for a new biologic, the sponsor (generally, the manufacturer) must demonstrate in the BLA that the biological product, and that the facility in which it is manufactured, processed, packed, or held, meets standards to assure that the product is safe, pure, and potent. As with other FDA-approved products, any subsequent change to the manufacturing process requires a demonstration to FDA of the comparability of the product's attributes before and after the change to ensure that the safety and effectiveness of the product is maintained. In 2010, the Biologics Price Competition and Innovation Act, or BPCIA, enacted as Title VII of the ACA established an abbreviated pathway under the PHSA for licensure of biosimilar biologics (i.e., biosimilars, sometimes referred to as follow-on biologics). A biosimilar is a biological product that is demonstrated to be "highly similar" (i.e., biosimilar), but not identical, to an FDA-licensed biological product (i.e., the reference product).

The BPCIA also establishes periods of exclusivity for a brand-name biologic (the reference product), one with a duration of 4 years and the other with a duration of 12 years. These periods of regulatory exclusivity initiate upon licensure of the new biological product if certain requirements are met. During the four-year exclusivity period, an abbreviated BLA for a biosimilar referencing the protected brand-name biologic may not be submitted to FDA. During the 12-year exclusivity period, approval of an abbreviated BLA for a biosimilar referencing the protected brand-name biologic may not be made effective, which means FDA may not approve the biosimilar application until 12 years after the date on which the reference product was first licensed.

In addition, the BPCIA provides for a process for disclosure and negotiation between the biosimilar applicant and reference product sponsor, sometimes referred to as the "patent dance". Although not mandatory on the party of the biosimilar applicant, the dance involves several rounds of informational exchanges concerning potential disputes over the biosimilar applicant's infringement of the reference product sponsor's patents. Also, biosimilar licensure under the BPCIA is not contingent upon resolution of patent disputes. Therefore, the FDA may approve a biosimilar despite unresolved patent issues between the reference product sponsor and the biosimilar applicant.

Some of our composition of matter patents for certain of our product candidates have expired or will expire prior to any product marketing approval. We intend to seek data exclusivity and market exclusivity for GPS, which we expect to be regulated by the FDA as a biological product, provided under the PHSA, and similar laws in other countries. We believe that GPS and NPS will qualify for four years of data exclusivity and 12 years of market exclusivity under the BPCIA. The law is complex and continues to be interpreted and implemented by the FDA. As a result, its ultimate impact, implementation, and meaning are subject to uncertainty. While it is uncertain when such processes intended to implement BPCIA may be fully adopted by the FDA, any such processes could have a material adverse effect on the future commercial prospects for our product candidates. There is also a risk that the U.S. Congress could amend the BPCIA to shorten the 12-year market exclusivity period or that the FDA will not consider our product candidates to be reference biological products pursuant to its interpretation of the exclusivity provisions of the BPCIA for competing products, potentially creating the opportunity for biosimilar competition sooner than anticipated after the expiration of our patent protection. Moreover, the extent to which a biosimilar, once approved, will be substituted for any reference product in a way that is similar to traditional generic substitution for non-biological products is not yet clear, and will depend on a number of marketplace and regulatory factors that are still developing. Under the BPCIA as well as state pharmacy laws, only interchangeable biosimilar products are considered substitutable for the reference biological product without the intervention of the health care provider who prescribed the original biological product. However, as with all prescribing decisions made in the context of a patient-provider relationship and a patient's specific medical needs, health care providers are not restricted from prescribing biosimilar products in an off-label manner.

Even if, as we expect, GPS and NPS are considered to be reference products eligible for 12 years of exclusivity under the BPCIA, a competitor could decide to forego the abbreviated approval pathway available for biosimilar products and to submit a full BLA for product licensure after completing its own preclinical studies and clinical trials. In such a situation, any exclusivity to which we may be eligible under the BPCIA would not prevent the competitor from marketing its biological product as soon as it is approved.

In Europe, the European Commission has granted marketing authorizations for several biosimilar products pursuant to a set of general and product class-specific guidelines for biosimilar approvals issued over the past few years. In addition, companies may be developing biosimilar products in other countries that could compete with our products, if approved.

The regulatory, or non-patent, exclusivity available to drugs or biologics in some countries is less than that provided by the United States. For instance, Canada currently provides for an eight-year period of exclusivity for new biological products, and Mexico provides for a five-year period of exclusivity. Furthermore, in some countries outside of the United States, peptide vaccines, such as GPS and NPS, are regulated as chemical drugs rather than as biologics and may or may not be eligible for non-patent exclusivity.

If competitors are able to obtain marketing approval for biosimilars referencing our therapeutic candidates, if approved, our future products may become subject to competition from such biosimilars, whether or not they are designated as interchangeable, with the attendant competitive pressure and potential adverse consequences. Such competitive products may be able to immediately compete with us in each indication for which our therapeutic candidates may have received approval.

If we are sued for infringing the intellectual property rights of third parties, such litigation could be costly and time-consuming and could prevent or delay our development and commercialization efforts.

Our commercial success depends, in part, on us and our collaborators not infringing the patents and proprietary rights of third parties. There is a substantial amount of litigation and other adversarial proceedings, both within and outside the United States, involving patent and other intellectual property rights in the biotechnology and pharmaceutical industries, including patent infringement lawsuits, interference or derivation proceedings, oppositions, and *inter partes* and post-grant review proceedings before the USPTO and non-U.S. patent offices. Numerous U.S. and non-U.S. issued patents and pending patent applications owned by third parties exist in the fields in which we are developing and may develop our current and future product candidates. As the biotechnology and pharmaceutical industries expand and more patents are issued, and as our product pipeline grows, the risk increases that our product candidates may be subject to claims of infringement of third parties' patent rights as it may not always be clear to industry participants, including us, which patents cover various types of products or

methods of use. The coverage of patents is subject to interpretation by the courts, and the interpretation is not always uniform or predictable.

If we are sued for patent infringement, we would need to demonstrate that our product candidates, products and methods either do not infringe the patent claims of the relevant patent or that the patent claims are invalid, and we may not be able to do this. Proving that a patent is invalid is difficult. If any issued third-party patents were held by a court of competent jurisdiction to cover aspects of our materials, formulations, methods of manufacture or methods for treatment, we could be forced, including by court order, to cease developing, manufacturing or commercializing the relevant product candidate until such patent expired. Alternatively, we may be required to obtain a license from such third party in order to use the infringing technology and to continue developing, manufacturing or marketing the infringing product candidate. We could be prevented from commercializing a product candidate 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. In addition, parties making claims against us may also 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 if we are found to have willfully infringed a patent, or to redesign our infringing product candidates, which may be impossible or require substantial time and monetary expenditure. We may also elect to enter into license agreements in order to settle patent infringement claims prior to litigation, and any such license agreement may require us to pay royalties and other fees that could be significant. 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 product candidates, programs or intellectual property could be diminished. Accordingly, the market price of our shares of common stock may decline.

We may not be able to protect our intellectual property rights throughout the world.

Filing, prosecuting, enforcing and defending patents on our current and future product candidates in all countries throughout the world would be prohibitively expensive. We or our licensors' intellectual property rights in certain countries outside the United States may be less extensive than those in the United States. In addition, the laws of certain foreign countries do not protect intellectual property rights to the same extent as laws in the United States. Consequently, we and our licensors may not be able to prevent third parties from practicing our and our licensors' inventions in countries outside the United States, or from selling or importing infringing products made using our and our licensors' inventions in and into the United States or other jurisdictions. Competitors may use our and our licensors' technologies in jurisdictions where we have not obtained patent protection or where we do not have exclusive rights under the relevant patent(s) to develop their own products and, further, may export otherwise infringing products to territories where we and our licensors have patent protection but where enforcement is not as strong as that in the United States. These infringing products may compete with our product candidates in jurisdictions where we or our licensors have no issued patents or where we do not have exclusive rights under the relevant patent(s), or our patent claims and other intellectual property rights may not be effective or sufficient to prevent them from so competing.

Many companies have encountered significant problems in protecting and defending intellectual property rights in foreign jurisdictions. The legal systems of certain countries, particularly certain developing countries, do not favor the enforcement of patents and other intellectual property protection, particularly those relating to biopharmaceuticals, which could make it difficult for us and our licensors to stop the infringement of our and our licensors' patents or marketing of competing products in violation of our and our licensors' proprietary rights generally. Certain governments outside the United States have indicated that compulsory licenses to patents may be sought to further their domestic policies or on the basis of national emergencies. Proceedings to enforce our and our licensors' patent rights in foreign jurisdictions could result in substantial costs and divert our attention from other aspects of our business, could put our and our licensors' patents at risk of being invalidated or interpreted narrowly, could put our and our licensors' patent applications at risk of not issuing, and could provoke third parties to assert claims against us or our licensors. We or our licensors may not prevail in any lawsuit that we or our licensors initiate, and even if we or our licensors are successful the damages or other remedies awarded, if any, may not be commercially meaningful.

We may become involved in lawsuits to protect or enforce our intellectual property, which could be expensive, time-consuming and unsuccessful and have a material adverse effect on the success of our business and on our stock price.

Third parties may infringe our patents, the patents of our licensors, or misappropriate or otherwise violate our or our licensors' intellectual property rights. We and our licensors' patent applications cannot be enforced against third parties practicing the technology claimed in such applications unless and until a patent issues from such applications, and then only to the extent the issued claims cover the technology. In the future, we or our licensors may elect to initiate legal proceedings to enforce or defend our or our licensors' intellectual property rights, to protect our or our licensors' trade secrets or to determine the validity or scope of intellectual property rights we own or control. Any claims that we assert against perceived infringers could also provoke these parties to assert counterclaims against us alleging that we infringe their intellectual property rights or that our intellectual property rights are invalid. In addition, third parties may initiate legal proceedings against us or our licensors to challenge the validity or scope of intellectual property rights we own or control. The proceedings can be expensive and time-consuming. Many of our or our licensors' adversaries in these proceedings may have the ability to dedicate substantially greater resources to prosecuting these legal actions than we or our licensors can. Accordingly, despite our or our licensors' efforts, we or our licensors may not be able to prevent third parties from infringing upon or misappropriating intellectual property rights we own or control, particularly in countries where the laws may not protect our rights as fully as in the United States. Litigation could result in substantial costs and diversion of management resources, which could harm our business and financial results. In addition, in an infringement proceeding, a court may decide that a patent owned by or licensed to us is invalid or unenforceable, in whole or in part, or may refuse to stop the other party from using the technology at issue on the grounds that our or our licensors' patents do not cover the technology in question. An adverse result in any litigation proceeding could put one or more of our or our licensors' patents at risk of being invalidated, held unenforceable or interpreted narrowly.

Interference or derivation proceedings provoked by third parties, brought by us or our licensors or collaborators, or brought by the USPTO or any non-U.S. patent authority may be necessary to determine the priority of inventions or matters of inventorship with respect to our or our licensors' patents or patent applications. We may also become involved in other proceedings, such as reexamination or opposition proceedings, *inter partes* review, post-grant review or other pre-issuance or post-grant proceedings in the USPTO or its foreign counterparts relating to our intellectual property or the intellectual property of others. An unfavorable outcome in any such proceeding could require us or our licensors to cease using the related technology and commercializing the affected product candidate, or to attempt to license rights to it from the prevailing party.

Our business could be harmed if the prevailing party does not offer us or our licensors a license on commercially reasonable terms if any license is offered at all. Even if we or our licensors obtain a license, it may be non-exclusive, thereby giving our competitors access to the same technologies licensed to us or our licensors. In addition, if the breadth or strength of protection provided by our or our licensor's patents and patent applications is threatened, it could dissuade companies from collaborating with us to license, develop or commercialize current and future product candidates. Even if we successfully defend such litigation or proceeding, we may incur substantial costs and it may distract our management and other employees. We could be found liable for monetary damages, including treble damages and attorneys' fees, if we are found to have willfully infringed a patent.

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. In addition, there could be public announcements of the results of hearings, motions or other interim proceedings or developments. If securities analysts or investors perceive these results to be negative, it could have a substantial adverse effect on the price of shares of our common stock. Furthermore, under Title XI of the Medicare Prescription Drug, Improvement, and Modernization Act of 2003, or MMA, certain agreements, including patent litigation settlement agreements between brand and generic drug companies, must be filed with the FTC and DOJ. The Patient Right to Know Drug Prices Act amended MMA Title XI, expanding the reporting requirements to include agreements between biosimilar product applicants and biologic companies.

Although we have taken steps to protect our trade secrets and unpatented know-how, by entering into confidentiality agreements with third parties, and proprietary information and invention agreements with certain employees, consultants and advisors, third parties may still obtain this information or we may be unable to protect our rights.

Proprietary trade secrets and unpatented know-how are also very important to our business. We also have limited control over the protection of trade secrets used by our licensors, collaborators and suppliers. There can be no assurance that binding agreements will not be breached, that we would have adequate remedies for any breach, or that our trade secrets and unpatented know-how will not otherwise become known or be independently discovered by our competitors. If trade secrets are independently discovered, we would not be able to prevent their use. Enforcing a claim that a third party illegally obtained and is using our trade secrets or unpatented know-how is expensive and time consuming, and the outcome is unpredictable.

We may be subject to claims that our employees, consultants or independent contractors have wrongfully used or disclosed to us alleged trade secrets of their other clients or former employers. As is common in the biotechnology and pharmaceutical industry, certain of our employees were formerly employed by other biotechnology or pharmaceutical companies, including our competitors or potential competitors. Moreover, we engage the services of consultants to assist us in the development of our commercial product and product candidates, many of whom were previously employed at or may have previously been or are currently providing consulting services to, other biotechnology or pharmaceutical companies, including our competitors or potential competitors. We may be subject to claims that these employees and consultants or we have inadvertently or otherwise used or disclosed trade secrets or other proprietary information of their former employers or their former or current customers. Litigation may be necessary to defend against these types of claims. Even if we are successful in defending against any such claims, any such litigation would likely be protracted, expensive, a distraction to our management team, not viewed favorably by investors and other third parties, and may potentially result in an unfavorable outcome.

If we are unable to protect the confidentiality of our trade secrets and other proprietary information, the value of our technology could be materially adversely affected, and our business could be harmed.

In addition to seeking the protection afforded by patents, we rely on trade secret protection and confidentiality agreements to protect proprietary know-how that is not patentable or that we elect not to patent, processes for which patents are difficult to enforce, and other elements of our technology, discovery and development processes that involve proprietary know-how, information or technology that is not covered by patents. Any disclosure to or misappropriation by third parties of our confidential proprietary information could enable competitors to quickly duplicate or surpass our technological achievements, including by enabling them to develop and commercialize products substantially similar to or competitive with our current or future product candidates, thus eroding our competitive position in the market. Trade secrets can be difficult to protect. We seek to protect our proprietary technology and processes, in part, by entering into confidentiality agreements and invention assignment agreements with our employees, consultants, and outside scientific advisors, contractors and collaborators. These agreements are designed to protect our proprietary information. Although we use reasonable efforts to protect our trade secrets, our employees, consultants, contractors, or outside scientific advisors might intentionally or inadvertently disclose our trade secrets or confidential, proprietary information to competitors. In addition, competitors may otherwise gain access to our trade secrets or independently develop substantially equivalent information and techniques. If any of our confidential proprietary information were to be lawfully obtained or independently developed by a competitor, we would have no right to prevent such competitor from using that technology or information to compete with us, which could harm our competitive position.

Enforcing a claim that a third party illegally obtained and is using any of our trade secrets is expensive and time consuming, and the outcome is unpredictable. In addition, the laws of certain foreign countries do not protect proprietary rights such as trade secrets to the same extent or in the same manner as the laws of the United States. Misappropriation or unauthorized disclosure of our trade secrets to third parties could impair our competitive advantage in the market and could materially adversely affect our business, results of operations and financial condition.

Some intellectual property that we have in-licensed, if created as a result of government funded programs, may be subject to certain federal regulations.

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

Risks Related to Commercialization of Our Current and Future Product Candidates

Our commercial success depends upon attaining significant market acceptance of our current and future product candidates, if approved, among physicians, patients, healthcare payors and cancer treatment centers.

Even if we obtain regulatory approval for any of our current or future product candidates, the products may not gain market acceptance among physicians, healthcare payors, patients or the medical community, including cancer treatment centers. Market acceptance of any product candidates for which we receive approval depends on a number of factors, including:

- the efficacy and safety of such product candidates as demonstrated in clinical trials;
- the clinical indications and patient populations for which the product candidate is approved;
- acceptance by physicians, major cancer treatment centers and patients of the drug as a safe and effective treatment;
- the adoption of novel immunotherapies by physicians, hospitals and third-party payors;
- the potential and perceived advantages of product candidates over alternative treatments;
- the safety of product candidates seen in a broader patient group, including our use outside the approved indications;
- any restrictions on use together with other medications;
- the prevalence and severity of any side effects;
- product labeling or product insert requirements of the FDA or other regulatory authorities;
- the timing of market introduction of our products as well as competitive products;
- the development of manufacturing and distribution processes for commercial scale manufacturing for our novel WT1 peptide cancer immunotherapy product candidate;
- the cost of treatment in relation to alternative treatments;
- the availability of coverage, formulary status and adequate reimbursement from third-party payors and government authorities;
- relative convenience and ease of administration; and
- the effectiveness of our sales and marketing efforts and those of our collaborators.

If any of our current and future product candidates are approved but fail to achieve market acceptance among physicians, patients, healthcare payors or cancer treatment centers, we will not be able to generate significant revenues, which would compromise our ability to become profitable.

Even if we are able to commercialize our current or future product candidates, the products may not receive coverage and adequate reimbursement from third-party payors in the United States and in other countries in which we seek to commercialize our products, which could harm our business.

Our ability to commercialize any product successfully will depend, in part, on the extent to which coverage and adequate reimbursement for these products and related treatments will be available from third-party payors, including government health administration authorities, private health insurers and other organizations.

Third-party payors determine which medications they will cover and establish reimbursement levels. A primary trend in the healthcare industry is cost containment. Third-party payors have attempted to control costs by limiting coverage and the amount of reimbursement for particular medications. Increasingly, third-party payors are requiring that drug companies provide them with predetermined discounts from list prices and are challenging the prices charged for medical products. Third-party payors may also seek additional clinical evidence, beyond the data required to obtain regulatory approval, demonstrating clinical benefit and value in specific patient populations before covering our products for those patients. We cannot be sure that coverage and adequate reimbursement will be available for any product that we commercialize and, if coverage is available, what the level of reimbursement will be. Coverage and reimbursement may impact the demand for, or the price of, any product candidate for which we obtain regulatory approval. If reimbursement is not available or is available only at limited levels, we may not be able to successfully commercialize any product candidate for which we obtain regulatory approval.

There may be significant delays in obtaining coverage and reimbursement for newly approved drugs, and coverage may be more limited than the purposes for which the drug is approved by the FDA or comparable foreign regulatory authorities. Moreover, eligibility for coverage and reimbursement does not imply that any drug will be paid for in all cases or at a rate that covers our costs, including research, development, manufacture, sale and distribution. Interim reimbursement levels for new drugs, if applicable, may also not be sufficient to cover our costs and may only be temporary. Reimbursement rates may vary according to the use of the drug and the clinical setting in which it is used, may be based on reimbursement levels already set for lower cost drugs and may be incorporated into existing payments for other services. Net prices for drugs may be reduced by mandatory discounts or rebates required by third-party payors and by any future relaxation of laws that presently restrict imports of drugs from countries where they may be sold at lower prices than in the United States. No uniform policy for coverage and reimbursement exists in the United States, and coverage and reimbursement can differ significantly from payor to payor. Third-party payors often rely upon Medicare coverage policy and payment limitations in setting their own reimbursement policies, but also have their own methods and approval process apart from Medicare determinations. Our inability to promptly obtain coverage and profitable reimbursement rates from both government-funded and private payors for any approved products that we develop could have a material adverse effect on our operating results, ability to raise capital needed to commercialize products and overall financial condition.

Healthcare legislative measures aimed at reducing healthcare costs may have a material adverse effect on our business and results of operations.

The United States and many foreign jurisdictions have enacted or proposed legislative and regulatory changes affecting the healthcare system that could prevent or delay marketing approval of our current product candidates and any future product candidates, restrict or regulate post-approval activities and affect our ability to profitably sell a product for which we obtain marketing approval. Changes in regulations, statutes or the interpretation of existing regulations could impact our business in the future by requiring, for example, changes to our manufacturing arrangements, additions or modifications to product labeling, the recall or discontinuation of our products, or additional record-keeping or reporting requirements. If any such changes were to be imposed, they could adversely affect the operation of our business.

In the United States, there have been and continue to be a number of legislative initiatives to contain healthcare costs. For example, the ACA substantially changed the way healthcare is financed by both governmental and private insurers, and significantly impacted the U.S. pharmaceutical industry. The ACA, among other things, subjected biological products to potential competition by lower-cost biosimilars, addressed a new methodology by which rebates owed by manufacturers under the Medicaid Drug Rebate Program are calculated for drugs and biologics that are inhaled, infused, instilled, implanted or injected, increased the minimum Medicaid rebates owed by manufacturers under the Medicaid Drug Rebate Program and extended the rebate program to individuals enrolled in Medicaid managed care organizations, established annual fees and taxes on manufacturers of certain branded prescription drugs and biologics, and created a new Medicare Part D coverage gap discount program, in which manufacturers must agree to offer 70% (increased from 50% pursuant to the Bipartisan Budget Act of 2018, effective as of 2019) point-of-sale discounts off negotiated prices of applicable brand drugs and biologics to eligible beneficiaries during their coverage gap period, as a condition for the manufacturer's outpatient drugs or biologics to be covered under Medicare Part D.

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

In addition, other legislative changes have been proposed and adopted since the ACA was enacted. On August 2, 2011, the Budget Control Act of 2011 was signed into law, which, among other things, resulted in reductions to Medicare payments to providers of 2% per fiscal year, which went into effect on April 1, 2013 and, due to subsequent legislative amendments to the statute, will remain in effect through 2030, with the exception of a temporary suspension from May 1, 2020 through June 30, 2022 (a 1% sequester will apply from April 1, 2022 through June 30, 2022) due to the COVID-19 pandemic, unless additional Congressional action is taken. On January 2, 2013, the American Taxpayer Relief Act of 2012 was signed into law, which, among other things, reduced Medicare payments to several providers, including hospitals and cancer treatment centers, and increased the statute of limitations period for the government to recover overpayments to providers from three to five years. As another example, the 2021 Consolidated Appropriations Act signed into law on December 27, 2020 incorporated extensive healthcare provisions and amendments to existing laws, including a requirement that all manufacturers of drugs and biological products covered under Medicare Part B report the product's average sales price, or ASP, to Department of Health and Human Services (HHS) beginning on January 1, 2022, subject to enforcement via civil money penalties.

Further, there has been heightened governmental scrutiny in the United States of pharmaceutical pricing practices in light of the rising cost of prescription drugs. Such scrutiny has resulted in several recent congressional inquiries and proposed and enacted federal and state legislation designed to, among other things, bring more transparency to product pricing, review the relationship between pricing and manufacturer patient programs, and reform government program reimbursement methodologies for products. Although a number of these and other measures may require additional authorization to become effective, Congress and the current U.S. administration have each indicated that it will continue to seek new legislative and/or administrative measures to control drug costs. Any reduction in reimbursement from Medicare and other government programs may result in a similar reduction in payments from private payors. Moreover, in July 2021, President Biden issued a sweeping executive order on promoting competition in the American economy that includes several mandates pertaining to the pharmaceutical and health care insurance industries. Among other things, the executive order directs the FDA to work towards implementing a system for importing drugs from Canada (following on a Trump administration notice-and-comment rulemaking on Canadian drug importation that was finalized in October 2020). The Biden order also called on HHS to release a comprehensive plan to combat high prescription drug prices, and it includes several directives regarding the Federal Trade Commission's oversight of potentially anticompetitive practices within the pharmaceutical industry. The drug pricing plan released by HHS in September 2021 in response to the executive order makes clear that the Biden Administration supports aggressive action to address rising drug prices, including allowing HHS to negotiate the cost of Medicare Part B and D drugs, but such significant changes will require either new legislation to be passed by Congress or time-consuming administrative actions. Accordingly, there remains a large amount of uncertainty regarding the federal government's approach to making pharmaceutical treatment costs more affordable for patients.

At the state level, legislatures have increasingly passed legislation and implemented regulations designed to control pharmaceutical and biological product pricing, including price or patient reimbursement constraints, discounts, restrictions on certain product access and marketing cost disclosure and transparency measures, and, in some cases, designed to encourage importation from other countries and bulk purchasing. or example, California requires pharmaceutical manufacturers to notify certain purchasers, including health insurers and government health plans at least 60 days before any scheduled increase in the wholesale acquisition cost (WAC), of their product if the increase exceeds 16%, and further requires pharmaceutical manufacturers to explain whether a change or improvement in the product necessitates such an increase. Similarly, Vermont requires pharmaceutical manufacturers to disclose price information on certain prescription drugs, and to provide notification to the state if introducing a new drug with a WAC in excess of the Medicare Part D specialty drug threshold. In December 2020, the U.S. Supreme Court also held unanimously that federal law does not preempt the states' ability to regulate pharmaceutical benefit managers, or PBMs, and other members of the healthcare and pharmaceutical supply chain, an important decision that may lead to further and more aggressive efforts by states in this area. Legally mandated price controls on payment amounts by third-party payors or other restrictions could harm our business, results of operations, financial condition and prospects. In addition, regional healthcare authorities and individual hospitals are increasingly using bidding procedures to determine what pharmaceutical products and which suppliers will be included in their prescription drug and other healthcare programs. This could reduce the ultimate demand for our product candidates, if approved, or put pressure on our product pricing, which could negatively affect our business, results of operations, financial condition and prospects.

We expect that the ACA, the recent laws described above, and other healthcare reform measures that may be adopted in the future may result in additional reductions in Medicare and other healthcare funding, more rigorous coverage criteria, new payment methodologies and additional downward pressure on the price that we receive for any approved product. Further, it is possible that additional governmental action will be taken in response to the COVID-19 pandemic. We cannot predict the initiatives that may be adopted in the future. The continuing efforts of the government, insurance companies, managed care organizations and other payors of healthcare services to contain or reduce costs of healthcare and/or impose price controls may adversely affect:

- the demand for our product candidates, if we obtain regulatory approval;
- our ability to receive or set a price that we believe is fair for our products;
- our ability to generate revenue and achieve or maintain profitability;
- our ability to enjoy or maintain market exclusivity;

- the level of taxes that we are required to pay; and
- the availability of capital.

Price controls may be imposed in foreign markets, which may adversely affect our future profitability.

In some countries, particularly member states of the European Union, the pricing of prescription drugs is subject to governmental control. In these countries, pricing negotiations with governmental authorities can take considerable time after receipt of regulatory approval for a product. In addition, there can be considerable pressure by governments and other stakeholders on 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 reimbursement has been obtained. Reference pricing used by various European Union member states and parallel distribution, or arbitrage between low-priced and high-priced member states, can further reduce prices. In some countries, we or our collaborators may be required to conduct a clinical trial or other studies that compare the cost-effectiveness of our product candidates to other available therapies in order to obtain or maintain 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. 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.

Risks Related to Healthcare Compliance Regulations

Our relationships with customers and third-party payors will be subject to applicable anti-kickback, fraud and abuse and other healthcare laws and regulations, which could expose us to criminal sanctions, civil penalties, contractual damages, reputational harm and diminished profits and future earnings. If we or they are unable to comply with these provisions, we may become subject to civil and criminal investigations and proceedings that could have a material adverse effect on our business, financial condition and prospects.

Healthcare providers, physicians and third-party payors will play a primary role in the recommendation and prescription of any product candidates for which we obtain regulatory approval. Our current and future arrangements with healthcare providers, healthcare entities, third-party payors and customers may expose us to broadly applicable fraud and abuse and other healthcare laws and regulations that may constrain the business or financial arrangements and relationships through which we research, develop and will market, sell and distribute our products. As a pharmaceutical company, even though we do not and will not control referrals of healthcare services or bill directly to Medicare, Medicaid or other third-party payors, federal and state healthcare laws and regulations pertaining to fraud and abuse and patients' rights are applicable to our business. Restrictions under applicable federal and state healthcare laws and regulations that may affect our ability to operate include the following:

- the federal healthcare Anti-Kickback Statute which prohibits, among other things, individuals and entities from knowingly and willfully soliciting, offering, receiving or providing remuneration, directly or indirectly, overtly or covertly, in cash or in kind, to induce or reward, or in return for, either the referral of an individual for, or the purchase, order or recommendation of, any good or service, for which payment may be made, in whole or in part, under a federal healthcare program such as Medicare or Medicaid;
- federal civil and criminal false claims laws, including the federal False Claims Act that can be enforced through civil whistleblower or qui tam actions, and civil monetary penalty laws, prohibit individuals or entities from knowingly presenting, or causing to be presented, to the federal government, including the Medicare and Medicaid programs, claims for payment or approval that are false or fraudulent or making a false statement to avoid, decrease or conceal an obligation to pay money to the federal government;
- the federal Health Insurance Portability and Accountability Act of 1996, or HIPAA, which imposes criminal and civil liability for executing a scheme to defraud any healthcare benefit program and also created federal criminal laws that prohibit knowingly and willfully falsifying, concealing or covering up a material fact or making any materially false statements in connection with the delivery of or payment for healthcare benefits, items or services, as amended by the Health Information Technology for Economic and Clinical Health Act of 2009, or HITECH, which imposes obligations, including mandatory contractual terms, with respect to safeguarding the privacy, security and transmission of individually

identifiable health information on entities subject to the law, such as certain healthcare providers, health plans, and healthcare clearinghouses, known as covered entities, and their respective business associates that perform services for them that involve the creation, use, maintenance or disclosure of, individually identifiable health information;

- the federal physician sunshine requirements under the ACA which requires certain manufacturers of drugs, devices, biologics and medical supplies, with certain exceptions, to report annually to HHS information related to payments and other transfers of value to physicians, other healthcare providers, and teaching hospitals, and ownership and investment interests held by physicians and other healthcare providers and their immediate family members and applicable group purchasing organizations;
- analogous state and foreign laws and regulations, such as state anti-kickback and false claims laws, which may apply to sales or marketing arrangements and claims involving healthcare items or services reimbursed by non-governmental third-party payors, including private insurers; some state laws which require pharmaceutical companies to comply with the pharmaceutical industry's voluntary compliance guidelines and the relevant compliance guidance promulgated by the federal government and may require drug manufacturers to report information related to payments and other transfers of value to physicians and other healthcare providers, marketing expenditures or pricing information; and certain state and local laws which require the registration of pharmaceutical sales representatives; and
- state and foreign laws govern the privacy and security of health information in specified circumstances, including the GDPR, many of which differ from each other in significant ways and often are not preempted by HIPAA, thus complicating compliance efforts.

Efforts to ensure that our business arrangements with third parties will comply with applicable healthcare laws and regulations will involve substantial costs. It is possible that governmental authorities will conclude that our business practices may not comply with current or future statutes, regulations or case law involving applicable fraud and abuse or other healthcare laws and regulations. If our operations are found to be in violation of any of these laws or any other governmental regulations that may apply to us, we may be subject to significant civil, criminal and administrative penalties, damages, fines, imprisonment, disgorgement, exclusion from government funded healthcare programs, such as Medicare and Medicaid, integrity oversight and reporting obligations, and the curtailment or restructuring of our operations. If any physicians or other healthcare providers or entities with whom we expect to do business are found to not be in compliance with applicable laws, they may be subject to criminal, civil or administrative sanctions, including exclusions from government funded healthcare programs. Many healthcare laws and regulations are rapidly changing and legislative bodies and regulatory agencies are regularly considering amendments and supplements to existing laws and regulations, and as a result interpretations of rules and confirmation of our compliance with such rules can be ambiguous.

Our employees may engage in misconduct or other improper activities, including noncompliance with regulatory standards and requirements, which could cause significant liability for us and harm our reputation.

We are exposed to the risk of employee fraud or other misconduct, including intentional failures to comply with FDA regulations or similar regulations of comparable foreign regulatory authorities, provide accurate information to the FDA or comparable foreign regulatory authorities, comply with manufacturing standards we have established, comply with federal and state healthcare fraud and abuse laws and regulations and similar laws and regulations established and enforced by comparable foreign regulatory authorities, report financial information or data accurately or disclose unauthorized activities to us. Employee misconduct could also involve the improper use of information obtained in the course of clinical trials, which could result in regulatory sanctions and serious harm to our reputation. It is not always possible to identify and deter employee 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 and results of operations, including the imposition of significant civil, criminal and administrative penalties, damages, fines, imprisonment, exclusion from government funded healthcare programs, such as Medicare and Medicaid, and integrity oversight and reporting obligations.

We have been involved in multiple legal and governmental proceedings, including securities class action litigation, and may in the future be involved in proceedings, relating to the commercial activities of our predecessor that could divert management's attention and adversely affect our financial condition and our business.

In the past, our predecessor, Galena, was involved in multiple legal and governmental proceedings, including stockholder class actions, both state and federal, none of which are ongoing. These legal and governmental actions, or the Galena Legacy Matters, included allegations relating to federal securities law violations, claims under the False Claims Act and Anti-Kickback Statute, claims regarding breaches of contract, and other stockholder allegations, including claims of breaches of fiduciary duty by our former directors, and fentanyl related litigation. Additionally, securities class action or stockholder derivative litigation has become common in our industry following the announcement of negative data or adverse events. We have in the past, and may in the future, become involved in this type of litigation. Litigation often is expensive and diverts management's attention and resources, which could adversely affect the continuing company's business.

There continues to be significant litigation and governmental activity generally in the fentanyl and opioid area, and this activity is expected to continue and may increase in the future. We cannot assure you we will not become subject to additional legal or governmental proceedings relating to Galena's former Abstral business in the future. Moreover, we may be exposed to claims, or other legal or governmental actions in the future relating to violations of the False Claims Act, Anti-Kickback Statute, the ACA, or any other applicable state or federal statutes or regulations, and thereby be subject to penalties, such as civil and criminal penalties, damages, fines, or an administrative action of exclusion from government health care reimbursement programs. Since DOJ published a memorandum in 2016 formally instructing prosecutors to focus on individual accountability when dealing with corporate misconduct, individual prosecutions have increased.

Future legal and governmental proceedings may not qualify for coverage under, or may exceed the limit of, our applicable directors and officers liability insurance policies and could have a material adverse effect on our financial condition, liquidity, and results of operations. An unfavorable outcome in any future litigation matters could damage our business and reputation. We can make no assurances as to the time or resources that would need to be devoted to any new or future litigation matters or their outcome, or the impact, if any, that these matters may have on our business or financial condition.

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

We face an inherent risk of product liability exposure related to the testing of our current or future product candidates in human clinical trials and will face an even greater risk if we commercially sell any products that we may develop. Product liability claims may be brought against us by subjects enrolled in our clinical trials, patients, healthcare providers or others using, administering or selling our products. If we cannot successfully defend ourselves against claims that our product candidates or products caused injuries, we could incur substantial liabilities. Regardless of merit or eventual outcome, liability claims may result in:

- decreased demand for any product candidates or products that we may develop;
- termination of clinical trial sites or entire clinical trial programs;
- injury to our reputation and significant negative media attention;
- withdrawal of clinical trial participants;
- significant costs to defend the related litigation;
- substantial monetary awards to trial subjects or patients;
- loss of revenue;
- diversion of management and scientific resources from our business operations; and
- the inability to commercialize any products that we may develop.

We currently hold product liability insurance coverage at a level that we believe is customary for similarly situated companies and adequate to provide us with insurance coverage for foreseeable risks, but which may not be adequate to cover all liabilities that we may incur. Insurance coverage is increasingly expensive. We may not be able to maintain insurance coverage at a reasonable cost or in an amount adequate to satisfy any liability that may arise. We intend to expand our insurance coverage for products to include the sale of commercial products if we obtain regulatory approval for our product candidates in development, but we may be unable to obtain commercially reasonable product liability insurance for any products that receive regulatory approval. Large judgments have been awarded in class action lawsuits based on drugs that had unanticipated side effects. A successful product liability claim or series of claims brought against us, particularly if judgments exceed our insurance coverage, could decrease our cash and adversely affect our business. In addition, even in instances where we have insurance coverage, our insurance carriers may deny coverage, which could lead to the inability to recover for certain losses and costly insurance coverage disputes with our carriers.

Risks Related to our Business Operations

Our business has been and may continue to be adversely affected by COVID-19.

The ongoing global COVID-19 pandemic, including the surges of cases from the Delta and Omicron variants, continues to disrupt our business operations and those of our contractors, CROs, suppliers, clinical sites, CMOs, and other partners. The COVID-19 pandemic could affect the health and availability of our workforce and that of the third-parties we rely on, such as our CROs, clinical sites, CMOs, and other contractors as well as the governmental agencies, such as the FDA and health authorities in other countries which could delay or otherwise adversely impact the ability of such parties to fulfill their obligations.

In particular, our clinical trial operations, including the REGAL study, have been directly and indirectly adversely impacted globally, and could continue to be directly and indirectly adversely impacted, by the COVID-19 pandemic. Restrictions on travel and/or transport of clinical materials as well as the diversion of hospital and clinical site staff and resources to COVID-19 infected patients has, and could continue, to disrupt clinical trial operations, including causing delays, potentially resulting in a slowdown in enrollment and/or deviations from or disruptions in key clinical trial activities, such as clinical site monitoring. Further, if the spread of COVID-19 continues, the operations of our CMOs for our clinical supply of GPS could be significantly delayed as well and we risk a delay, default and/or nonperformance under our existing agreements. While we believe that we currently have sufficient supply of our product candidates to continue our ongoing clinical trials, such delays, defaults or non-performance could materially adversely affect the timelines of our clinical trials.

The COVID-19 pandemic and mitigation measures also may have an adverse impact on global economic conditions, which could adversely impact our business, financial condition or results of operations. Additionally, the COVID-19 pandemic has resulted in significant financial market volatility and uncertainty. A continuation or worsening of the levels of market disruption or volatility seen in the recent past due to the COVID-19 pandemic could have an adverse impact on our ability to access capital and on the market price of our common stock. It is currently not possible to predict how long the COVID-19 pandemic will last, including whether there will be additional surges from new variants, or the time that it will take for economic activity to return to pre-pandemic levels. The extent to which COVID-19 impacts our business and operations, and our employees, suppliers, CROs and other partners will depend on future developments that are highly uncertain and cannot be predicted, including the duration of the outbreak, the continued availability and efficacy of vaccines, new information which may emerge concerning the severity of COVID-19, the emergence of new variants of COVID-19, and the actions to contain COVID-19 or treat its impact, among others.

If we fail to maintain an effective system of internal control over financial reporting, we may not be able to accurately report our financial results or prevent fraud. As a result, stockholders could lose confidence in our financial and other public reports, which would harm our business, the trading price of our common stock and our ability to raise additional capital in the future.

Effective internal controls over financial reporting are necessary for us to provide reliable financial reports and, together with adequate disclosure controls and procedures, are designed to prevent fraud. Any failure to implement required new or improved controls, or difficulties encountered in their implementation, could cause us to fail to meet our reporting obligations. Ineffective internal controls could also cause investors to lose confidence in our reported financial information, which could have a negative effect on the trading price of our common stock, and which could impact our ability to raise capital in the future. In addition, any future testing by us conducted in connection with Section 404 of the Sarbanes-Oxley Act of 2002, as amended (“SOX”), or any required subsequent testing by our independent registered public accounting firm, may reveal deficiencies in our internal controls over financial reporting that are deemed to be material weaknesses or that may require prospective or retroactive changes to our consolidated financial statements or identify other areas for further attention or improvement.

We are required, pursuant to Section 404 of SOX, to furnish a report by management on, among other things, the effectiveness of our internal control over financial reporting as of December 31, 2021. However, our independent registered public accounting firm is not required to attest to the effectiveness of our internal control over financial reporting pursuant to Section 404. Under the supervision and with the participation of our Chief Executive Officer and Vice President Finance and Chief Accounting Officer, our management conducted an evaluation of the effectiveness of our internal control over financial reporting based on the guidelines in the Internal Control-Integrated Framework (2013) issued by the Committee of Sponsoring Organizations of the Treadway Commission. Based on that evaluation, our management concluded that our internal control over financial reporting was effective as of December 31, 2021. An independent assessment of the effectiveness of our internal controls could detect problems that our management’s assessment might not. Undetected material weaknesses in our internal controls could lead to financial statement restatements and require us to incur the expense of remediation.

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

We face competition from numerous pharmaceutical and biotechnology enterprises, as well as from academic institutions, government agencies and private and public research institutions for our current product candidates. Our commercial opportunities will be reduced or eliminated if our competitors develop and commercialize products that are safer, more effective, have fewer side effects or are less expensive than any products that we may develop. Competition could result in reduced sales and pricing pressure on our current or future product candidates, if approved, which in turn would reduce our ability to generate meaningful revenues and have a negative impact on our results of operations. In addition, significant delays in the development of our product candidates could allow our competitors to bring products to market before we do and impair our ability to commercialize our product candidates. The biotechnology industry, including the cancer immunotherapy market, is intensely competitive and involves a high degree of risk. We compete with other companies that have far greater experience and financial, research and technical resources than us. Potential competitors in the United States and worldwide are numerous and include pharmaceutical and biotechnology companies, educational institutions and research foundations, many of which have substantially greater capital resources, marketing experience, research and development staffs and facilities than ours. Some of our competitors may develop and commercialize products that compete directly with those incorporating our technology or may introduce products to market earlier than our products or on a more cost-effective basis. In addition, our technology may be subject to competition from other technology or methods developed using techniques other than those developed by traditional biotechnology methods. Our competitors compete with us in recruiting and retaining qualified scientific and management personnel as well as in acquiring technologies complementary to our technology. Our company and our collaborators may face competition with respect to product efficacy and safety, ease of use and adaptability to various modes of administration, acceptance by physicians, the timing and scope of regulatory approvals, availability of resources, reimbursement coverage, price and patent position, including the potentially dominant patent positions of others. An inability to successfully complete our product development or commercializing those product candidates could result in our having limited prospects for establishing market share or generating revenue from our technology.

There are several agents in clinical development in potentially comparable settings to our Phase 3 AML clinical development program for GPS. The most advanced of these products is Onureg (oral azacitidine) under development by Bristol-Myers Squibb, or BMS, which was approved by the FDA in September 2020 for maintenance therapy of AML patients after having achieved first complete remission. There are several of other investigational immunotherapies advancing through Phase 2 and Phase 3 trials for target indications that we believe are also potential target indications for GPS. If these or other therapies are successful in their development, it could negatively impact our ability to enroll our clinical trials and could negatively impact the commercial potential of GPS.

Principal competitors for our AML indication include both companies with currently approved products in AML, such as AbbVie/Genentech (the holders of rights to VENCLEXTA), Servier (the holder of U.S. rights to TIBSOVO), Novartis AG (the holder of rights to RYDAPT), Astellas Pharmaceuticals (the holder of rights to XOSPATA), BMS (the holder of rights to ONUREG/VIDAZA and IDHIFA), Otsuka Pharmaceutical Co., Ltd. (the holder of rights to DACOGEN), among others, as well as those with front-line chemotherapy drugs and maintenance therapies such as Jazz Pharmaceuticals, Inc. (the holder of rights to VYXEOS), as well as Pfizer Inc. (the holder of rights to MYLOTARG and DAURISMO), among others, as well as companies with drugs currently in development in AML, such Daiichi Sankyo (the holder of rights to quizartinib/licensed in Japan under the trade name VANFLYTA), Karyopharm Therapeutics, Inc. (the holder of rights to XPOVIO), Pfizer Inc./AROG Pharmaceuticals, LLC (the holders of rights to crenolanib), Novartis AG (the holder of rights to MBG453), Johnson & Johnson/Janssen Pharmaceuticals, Inc. (the holder of rights to cusatuzumab, or ARGX-110/JNJ-4550), Gilead Sciences, Inc. (the holder of rights to magrolimab, or Hu5F9 G4), and Actinium Pharmaceuticals, Inc. (the holder of rights to [131]-iodine-apamistamab, or Iomab-B), among others. Companies currently engaged in the clinical development of AML therapies with an immunological/immuno-modulatory mechanism of action include Pfizer Inc./EMD Serono (the holders of rights to BAVENCIO), BMS (the holder of rights to YERVOY), MacroGenics, Inc./Les Laboratoires Servier, SA (the holders of rights to flotetuzumab, or MGD006), Celyad Oncology SA (the holder of rights to CYAD-01), Fortress Biotech, Inc. (the holder of rights to CNDO-109), Glycostem Therapeutics BV (the holder of rights to oNKord), iCell Gene Therapeutics, LLC (the holder of rights to CLL1-CD33 Compound CAR T-cell), among others. Finally, companies currently engaged in the clinical development of WT1-targeting vaccines (not specifically for AML) include Otsuka Pharmaceutical Co., Ltd. (the holder of rights to OCV-501) and Dainippon Sumitomo Pharma Co., Ltd./ Boston Biomedical, Inc. (the holder of rights to DSP-7888/ade-gramotide/nelatimotide).

We are also conducting clinical development programs in combination with cancer checkpoint inhibitors. This is a highly competitive field, with hundreds of such combination trials with various checkpoint inhibitors ongoing. If one or more of these combinations produce positive results in indications that we believe are targets for GPS (either in combination or in stand-alone administration) this could increase the difficulty for us to conduct our trials and could negatively impact our path to regulatory approval and our ability to successfully commercialize our products.

Many of our competitors or potential competitors have significantly greater established presence in the market, financial resources and expertise in research and development, manufacturing, preclinical testing, conducting clinical trials, obtaining regulatory approvals and marketing approved products than we do, and as a result may have a competitive advantage over us. Mergers and acquisitions in the pharmaceutical and biotechnology industries may result in even more resources being concentrated among a smaller number of our competitors. Smaller or early-stage companies may also prove to be significant competitors, particularly through collaborative arrangements with large and established companies. These third parties compete with us in recruiting and retaining qualified scientific and management personnel, establishing clinical trial sites and patient registration for clinical trials, as well as in acquiring technologies and technology licenses complementary to our programs or potentially advantageous to our business.

As a result of these factors, these competitors may obtain regulatory approval of their products before we are able to obtain patent protection or other intellectual property rights, which will limit our ability to develop or commercialize our current or future product candidates. Our competitors may also develop drugs that are safer, more effective, more widely used and cheaper than ours, and may also be more successful than us in manufacturing and marketing their products. These appreciable advantages could render our product candidates obsolete or noncompetitive before we can recover the expenses of development and commercialization.

We enter into various contracts in the normal course of our business in which we may be required to indemnify the other party to the contract under certain specific scenarios. In the event we have to perform under these indemnification provisions, it could have a material adverse effect on our business, financial condition and results of operations.

In the normal course of business, we periodically enter into academic, commercial, service, collaboration, licensing, consulting and other agreements that contain indemnification provisions. With respect to our academic and other research agreements, we typically agree to indemnify the institution and related parties from losses arising from claims relating to the products, processes or services made, used, sold or performed pursuant to the agreements for which we have secured licenses, and from claims arising from our or our sublicensees' exercise of rights under the agreement. With respect to our collaboration agreements, we indemnify our collaborators from any third-party product liability claims that could result from the production, use or consumption of the product, as well as for alleged infringements of any patent or other intellectual property right by a third party. With respect to consultants, we indemnify them from claims arising from the good faith performance of their services.

Should our obligations under an indemnification provision exceed applicable insurance coverage or if we were denied insurance coverage for any claim, our business, financial condition and results of operations could be adversely affected. Similarly, if we are relying on a collaborator to indemnify us and the collaborator is denied insurance coverage for the claim or the indemnification obligation exceeds the applicable insurance coverage, and if the collaborator does not have other assets available to indemnify us, our business, financial condition and results of operations could be adversely affected.

Significant disruptions of information technology systems, computer system failures or breaches of information security could adversely affect our business.

We rely to a large extent upon sophisticated information technology networks and systems to operate our business. In the ordinary course of business, we collect, store and transmit large amounts of confidential information (including, but not limited to, personal information and intellectual property). We also have outsourced significant elements of our operations to third parties, including significant elements of our information technology infrastructure and, as a result, we are managing many independent vendor relationships with third parties who may or could have access to our confidential information. The size and complexity of our information technology and information security systems, and those of our third-party vendors with whom we contract (and the large amounts of confidential information that is present on them), make such systems potentially vulnerable to service interruptions or to security breaches from inadvertent or intentional actions by our employees or vendors, or from malicious attacks by third parties. Such attacks are of ever-increasing levels of sophistication and are made by groups, including nation states and organized crime, and individuals with a wide range of motives (including, but not limited to, industrial espionage and market manipulation) and expertise. These threats pose a risk to the security of our systems and networks and the confidentiality, availability and integrity of our data. While we have invested significantly in the protection of data and information technology, there can be no assurance that we will be able to detect any such disruption or security breach in a timely manner or at all or that our efforts will prevent service interruptions or security breaches.

Our internal computer systems, and those of MSK, our CROs, our CMOs, and other business vendors on which we rely, are vulnerable to damage from computer viruses, unauthorized access, natural disasters, fire, terrorism, war and telecommunication and electrical failures. We exercise little or no control over these third parties, which increases our vulnerability to problems with their systems. If such an event were to occur and cause interruptions in our operations, it could result in a material disruption of our drug development programs. Any interruption or breach in our systems could adversely affect our business operations and/or result in the loss of critical or sensitive confidential information or intellectual property, and could result in financial, legal, business and reputational harm to us or allow third parties to gain material, inside information that they use to trade in our securities. For example, the loss of clinical trial data from completed or ongoing clinical trials could result in delays in our regulatory approval efforts and significantly increase our costs to recover or reproduce the data. To the extent that any disruption or security breach results in a loss of or damage to our data or applications, or inappropriate disclosure of confidential or proprietary information, we could incur liability, the further development of our current and future product candidates could be delayed and our business could be otherwise adversely affected. In addition, we do not maintain separate cyber liability insurance.

We will need to grow the size of our organization in the future, and we may experience difficulties in managing this growth.

As of December 31, 2021, we had 11 full-time employees. We will need to grow the size of our organization in order to support our continued development and potential commercialization of our product candidates. As our development and commercialization plans and strategies continue to develop, our need for additional managerial, operational, manufacturing, regulatory, sales, marketing, financial and other resources may increase. Our management, personnel and systems currently in place may not be adequate to support this future growth. Future growth would impose significant added responsibilities on members of management, including:

- managing our clinical trials effectively;
- identifying, recruiting, maintaining, motivating and integrating additional employees;
- managing our internal development efforts effectively while complying with our contractual obligations to licensors, licensees, contractors and other third parties;
- improving our managerial, development, operational, information technology, human resources and finance systems; and
- expanding our facilities.

If our operations expand, we will also need to manage additional relationships with various strategic partners, suppliers and other third parties. 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, as well as our ability to develop a sales and marketing force when appropriate for our company. To that end, we must be able to manage our development efforts and preclinical studies and clinical trials effectively and hire, train and integrate additional management, research and development, manufacturing, administrative and sales and marketing personnel. The failure to accomplish any of these tasks could prevent us from successfully growing our company.

The requirements of being a public company may strain our resources, divert management's attention and affect our ability to attract and retain qualified board members.

As a public company, we are subject to the reporting requirements of the Exchange Act, the Sarbanes-Oxley Act, the Dodd-Frank Act, the listing requirements of Nasdaq and other applicable securities rules and regulations. Compliance with these rules and regulations has increased, and will likely continue to increase, our legal and financial compliance costs, make some activities more difficult, time-consuming or costly, and place significant strain on our personnel, systems and resources. In addition, changing laws, regulations and standards relating to corporate governance and public disclosure are creating uncertainty for public companies, increasing legal and financial compliance costs and making some activities more time consuming. These laws, regulations and standards are subject to varying interpretations, in many cases due to their lack of specificity, and, as a result, their application in practice may evolve over time. This could result in continuing uncertainty regarding compliance matters, higher administrative expenses and a diversion of management's time and attention. Further, if our compliance efforts 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. Being a public company that is subject to these rules and regulations also makes it more expensive for us to obtain and retain director and officer liability insurance, and we may in the future be required to accept reduced coverage or incur substantially higher costs to obtain or retain adequate coverage. These factors could also make it more difficult for us to attract and retain qualified members of our board of directors and qualified executive officers.

Our future success depends on our ability to retain our executive officers and to attract, retain and motivate qualified personnel.

We are highly dependent upon our personnel, including Dr. Angelos M. Stergiou M.D., Sc.D. h.c., our President and Chief Executive Officer, and member of our board of directors. Our employment agreement with Dr. Stergiou does not prevent him from terminating his employment with us at any time. The loss of Dr. Stergiou's services could impede the achievement of our research, development and commercialization objectives. We have not obtained, do not own, nor are we the beneficiary of, key-person life insurance. We employ our executive officers, other than Dr. Stergiou, on an at-will basis and their employment can be terminated by them or us at any time, for any reason and without notice. The loss of any member of our senior management team or the inability to hire or retain experienced senior management personnel could compromise our ability to execute our business plan and harm our operating results.

In order to retain valuable employees at our company, in addition to salary and discretionary bonus payments, we provide stock options and restricted stock units (RSUs) that vest over time. The value to our employees of stock options and RSUs could be significantly affected by movements in our stock price that are beyond our control and may at any time be insufficient to counteract offers from other companies.

Our future growth and success depends not only on our ability to retain, manage and motivate our employees but also on our ability to recruit new employees which is key to our growth. We might not be able to attract or retain qualified management and other key personnel in the future due to the intense competition for qualified talent among biotechnology, pharmaceutical and other businesses. We could have difficulty attracting experienced personnel to our company and may be required to expend significant financial resources in our employment recruitment and retention efforts. Many pharmaceutical and biotechnology companies with whom we compete for qualified personnel have greater financial and other resources, different risk profiles and longer histories in the industry than we do.

The Tax Cuts and Jobs Act could adversely affect our business and financial condition.

H.R. 1, "An Act to provide for reconciliation pursuant to title II and V of the concurrent resolution on the budget for fiscal year 2018," informally entitled the Tax Cuts and Jobs Act, or the Tax Act, enacted on December 22, 2017, among other things, contains significant changes to corporate taxation, including reduction of the corporate tax rate from a top marginal rate of 35% to a single rate of 21%, limitation of the tax deduction for interest expense to 30% of adjusted taxable income (except for certain small businesses), limitation of the deduction for net operating losses carried forward from taxable years beginning after December 31, 2017 to 80% of current year taxable income and elimination of net operating loss carrybacks, one time taxation of offshore earnings at reduced rates regardless of whether they are repatriated, elimination of U.S. tax on foreign earnings (subject to certain important exceptions), providing immediate deductions for certain new investments instead of deductions for depreciation expense over time, and modifying or repealing many business deductions and credits (including reduction of tax credits under the Orphan Drug Act). Notwithstanding the reduction in the corporate income tax rate, the overall impact of the Tax Act is uncertain and our business and financial condition could be adversely affected. In addition, it is uncertain if and to what extent various states will conform to the Tax Act.

Notwithstanding the reduction in the corporate income tax rate, the overall impact of the Tax Act remains uncertain and our business and financial condition could be adversely affected. In addition, as part of Congress' response to the COVID-19 pandemic, the Families First Coronavirus Response Act, or the FFCR Act, was enacted on March 18, 2020, the Coronavirus Aid, Relief, and Economic Security Act, or the CARES Act, was enacted on March 27, 2020, and COVID relief provisions were included in the Consolidated Appropriations Act, 2021 or CAA, which was enacted on December 27, 2020. All contain numerous tax provisions. Regulatory guidance under the Tax Act, the FFCR Act, the CARES Act, and the CAA is and continues to be forthcoming, and such guidance could ultimately increase or lessen their impact on our business and financial condition. It is also likely that Congress will enact additional legislation in connection with the COVID-19 pandemic, and as a result of the changes in the U.S. presidential administration and control of the U.S. Senate, additional tax legislation may also be enacted; any such additional legislation could have an impact on us. In addition, it is uncertain if and to what extent various states will conform to the TCJA, the FFCR Act, the CARES Act, or the CAA.

Our ability to use net operating losses to offset future taxable income may be subject to limitations.

As of December 31, 2021, we had federal and state net operating loss carryforwards of approximately $42.6 million and $2.0 million, respectively. Our NOLs generated in tax years ending on or prior to December 31, 2017 are only permitted to be carried forward for 20 years under applicable U.S. tax laws, and will begin to expire, if not utilized, beginning in 2027. These NOL carryforwards could expire unused and be unavailable to offset future income tax liabilities. Under the Tax Act, federal NOLs incurred in tax years ending after December 31, 2017 may be carried forward indefinitely, but the deductibility of such federal NOLs is limited. It is uncertain if and to what extent various states will conform to the Tax Act, or whether any further regulatory changes may be adopted in the future that could minimize its applicability. In addition, under Section 382 of the Internal Revenue Code of 1986, as amended, and certain corresponding provisions of state law, if a corporation undergoes an "ownership change," which is generally defined as a greater than 50% change, by value, in the ownership of its equity over a three-year period, the corporation's ability to use its pre-change NOL carryforwards and other pre-change tax attributes to offset its post-change income may be limited. The Merger constituted an ownership change and as such, our ability to use our NOL carryforwards is materially limited, which may harm our future operating results by effectively increasing our future tax obligations.

Risks Related to Ownership of Our Common Stock

We will likely need to secure additional capital which may cause dilution to you and our existing stockholders, provide subsequent investors with rights and preference that are senior to yours, restrict our operations or require us to relinquish rights to our product candidates on unfavorable terms to us.

We will likely need to raise additional capital in the future. If we raise funds through the issuance of debt or equity, any debt securities or preferred stock issued will have rights, preferences and privileges senior to those of holders of our common stock in the event of a liquidation. In such event, there is a possibility that once all senior claims are settled, there may be no assets remaining to pay out to the holders of common stock. In addition, if we raise funds through the issuance of additional equity, whether through private placements or additional public offerings, such an issuance would dilute our stockholders and, similar to some of our past financings, may contain terms that could result in additional further significant dilution in the future. Debt financing, if available, could include covenants limiting or restricting our ability to take certain actions, such as incurring additional debt, making capital expenditures, entering into licensing arrangements, or declaring dividends, and may require us to grant security interests in our assets, including our intellectual property and for our subsidiaries to guarantee our obligations.

The market price and trading volume of shares of our common stock may be volatile.

The market price of shares of our common stock has exhibited substantial volatility. Between January 4, 2021 and December 31, 2021, the daily closing price of shares of our common stock as reported on Nasdaq ranged from a low of $5.36 to a high of $13.71. The market price of shares of our common stock could continue to fluctuate significantly for many reasons, including the following factors:

- reports of the results of our clinical trials regarding the safety or efficacy of our product candidates and surrogate markers;
- announcements of regulatory developments or technological innovations by us or our competitors;
- announcements of business or strategic transactions or our success in finalizing such a transaction;
- announcements of legal or regulatory actions against us or any adverse outcome of any such actions;
- changes in our relationships with our licensors, licensees and other strategic partners;
- low volume in the number of shares of our common stock traded on Nasdaq;
- our quarterly operating results;
- announcements of dilutive financing;

- announcements of additional potential reverse stock split;
- developments in patent or other technology ownership rights;
- additional funds may not be available on terms that are favorable to us and, in the case of equity financings, may result in dilution to our stockholders;
- government regulation of drug pricing; and
- general market conditions and other factors unrelated to our operating performance or the operating performance of our competitors, including deteriorating market conditions due to investor concerns regarding inflation and hostilities between Russia and Ukraine.

Factors beyond our control may also have an impact on the market price of shares of our common stock. For example, to the extent that other companies within our industry experience declines in their stock prices, the market price of shares of our common stock may decline as well.

Inadequate funding for the FDA, the SEC and other domestic and foreign government agencies could hinder their ability to hire and retain key leadership and other personnel, prevent new products and services from being developed or commercialized in a timely manner or otherwise prevent those agencies from performing normal business functions on which the operation of our business may rely, which could negatively impact our business.

The ability of the FDA or foreign regulatory authorities to review and approve new products can be affected by a variety of factors, including government budget and funding levels, ability to hire and retain key personnel and accept the payment of user fees, and statutory, regulatory, and policy changes. Average review times at the agency have fluctuated in recent years as a result. In addition, government funding of the SEC and other government agencies on which our operations may rely, including those 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 new drugs to be reviewed and/or approved by necessary government agencies, which would adversely affect our business. For example, over the last several years the U.S. government has shut down several times and certain regulatory agencies, such as the FDA and the SEC, have had to furlough critical FDA, SEC and other government employees and stop critical activities. If a prolonged government shutdown were to occur, it could significantly impact the ability of the FDA to timely review and process our regulatory submissions, which could have a material adverse effect on our business and could impact our ability to access the public markets and obtain necessary capital in order to properly capitalize and continue our operations.

Future sales of substantial amounts of our common stock, or the possibility that such sales could occur, could adversely affect the market price of our common stock.

Future sales in the public market of shares of our common stock, including shares referred to in the foregoing risk factors or shares issued upon exercise of our outstanding stock options or warrants, or the perception by the market that these sales could occur, could lower the market price of our common stock or make it difficult for us to raise additional capital.

As of December 31, 2021, we had reserved for issuance 533,770 shares of our common stock issuable upon the exercise of outstanding stock options at a weighted-average exercise price of $10.09 per share, 200,280 shares of our common stock issuable upon the vesting of outstanding restricted stock units with a weighted average grant date fair value of $2.81 per share, and 518,858 shares of our common stock issuable upon the exercise of outstanding warrants at a weighted-average exercise price of $29.15 per share. Upon exercise or conversion, the underlying shares, similar to those issued as the settlement payment, may be resold into the public market. In the case of outstanding securities that have exercise or conversion prices that are below the market price of our common stock from time to time, our stockholders would experience dilution upon the exercise or conversion of these securities.

Certain of our securityholders have registration rights and they can require us, subject to certain limitations, to register their securities for resale and to maintain such registration. Any such resales into the public market could place downward pressure on the price of our common stock.

We have issued and may issue additional preferred stock in the future, and the terms of the preferred stock may reduce the value of our common stock.

We are authorized to issue up to 5,000,000 shares of preferred stock in one or more series. Our board of directors may determine the terms of future preferred stock offerings without further action by our stockholders. If we issue shares of preferred stock, it could affect stockholder rights or reduce the market value of our outstanding common stock. In particular, specific rights granted to future holders of preferred stock may include voting rights, preferences as to dividends and liquidation, conversion and redemption rights, sinking fund provisions, and restrictions on our ability to merge with or sell our assets to a third party.

We have settled in the past and may in the future settle legal claims through the issuance of freely tradable shares of our common stock, which results in dilution to holders of our common stock and may adversely affect the market price of our common stock.

We have settled in the past and may in the future settle legal claims through the issuance of freely tradable shares of our common stock. We may issue additional shares of common stock as settlement payments in the future. Payment of these amounts in our common stock could cause significant dilution to our stockholders, and the amount of that dilution will vary depending on the price of our common stock at the time of the payment. In addition, the issuance of such a significant number of shares of our may cause a decrease in the trading price of our common stock.

Anti-takeover provisions of our Amended and Restated Certificate of Incorporation and our Amended and Restated Bylaws and provisions of Delaware law could delay or prevent a change of control.

Anti-takeover provisions of our Amended and Restated Certificate of Incorporation and our Amended and Restated Bylaws may discourage, delay or prevent a merger or other change of control that stockholders may consider favorable or may impede the ability of the holders of our common stock to change our management and may be constrained by other contractual agreements with third parties. These provisions of our Amended and Restated Certificate of Incorporation and our Amended and Restated Bylaws, among other things:

- divide our Board of Directors into three classes, with members of each class to be elected for staggered three-year terms;
- limit the right of securityholders to remove directors;
- prohibit stockholders from acting by written consent;
- regulate how stockholders may present proposals or nominate directors for election at annual meetings of stockholders; and
- authorize our Board to issue preferred stock in one or more series, without stockholder approval.

In addition, Section 203 of the Delaware General Corporation Law provides that, subject to limited exceptions, persons that acquire, or are affiliated with a person that acquires, more than 15% of the outstanding voting stock of a Delaware corporation shall not engage in any business combination with that corporation, including by merger, consolidation or acquisitions of additional shares for a three-year period following the date on which that person or our affiliate crosses the 15% stock ownership threshold. Section 203 could operate to delay or prevent a change of control of us.

If our common stock becomes subject to the penny stock rules, it may be more difficult to sell our common stock.

The SEC has adopted rules that regulate broker-dealer practices in connection with transactions in penny stocks. Penny stocks are generally equity securities with a price of less than $5.00 (other than securities registered on certain national securities exchanges or authorized for quotation on certain automated quotation systems, provided that current price and volume information with respect to transactions in such securities is provided by the exchange or system). The OTC Bulletin Board does not meet such requirements and if the price of our common stock is less than $5.00 and our common stock is no longer listed on a national securities exchange such as Nasdaq, our stock may be deemed a penny stock. The penny stock rules require a broker-dealer, at least two business days prior to a transaction in a penny stock not otherwise exempt from those rules, to deliver to the customer a standardized risk disclosure document containing specified information and to obtain from the customer a signed and date acknowledgment of receipt of that document. In addition, the penny stock rules require that prior to effecting any transaction in a penny stock not otherwise exempt from those rules, a broker-dealer must make a special written determination that the penny stock is a suitable investment for the purchaser and receive: (i) the purchaser's written acknowledgment of the receipt of a risk disclosure statement; (ii) a written agreement to transactions involving penny stocks; and (iii) a signed and dated copy of a written suitability statement. These disclosure requirements may have the effect of reducing the trading activity in the secondary market for our common stock, and therefore stockholders may have difficulty selling their shares.

Our common stock may be delisted from the Nasdaq Capital Market which could negatively impact the price of our common stock, liquidity and our ability to access the capital markets.

The listing standards of the Nasdaq Capital Market provide that a company, in order to qualify for continued listing, must maintain a minimum stock price of $1.00 and satisfy standards relative to minimum stockholders' equity, minimum market value of publicly held shares and various additional requirements. If we fail to comply with all listing standards applicable to issuers listed on the Nasdaq Capital Market, our common stock may be delisted. If our common stock is delisted, it could reduce the price of our common stock and the levels of liquidity available to our stockholders. In addition, the delisting of our common stock could materially adversely affect our access to the capital markets and any limitation on liquidity or reduction in the price of our common stock could materially adversely affect our ability to raise capital. Delisting from the Nasdaq Capital Market could also result in other negative consequences, including the potential loss of confidence by suppliers, customers and employees, the loss of institutional investor interest and fewer business development opportunities.

In the past, we received a letter from Nasdaq indicating that we did not meet the minimum bid price of $1.00 per share required for continued listing on the Nasdaq Capital Market pursuant to the Minimum Bid Price Rule. Although we have regained compliance with the Minimum Bid Price Rule after implementing reverse stock splits, there can be no assurance that we will be able to meet the minimum closing bid price rule or other listing requirements in the future.

We have never declared or paid cash dividends on our common stock and we do not anticipate paying cash dividends on our common stock in the foreseeable future.

Our business requires significant funding. We currently plan to invest all available funds and future earnings in the development and growth of our business and do not anticipate paying any cash dividends on our common stock in the foreseeable future. As a result, capital appreciation, if any, of our common stock will be our stockholders' sole source of potential gain for the foreseeable future.

ITEM 1B. UNRESOLVED STAFF COMMENTS

None.

ITEM 2. PROPERTIES

We lease our headquarters in New York, New York. The lease covers approximately 8,455 square feet of office space, which includes additional space beginning on February 22, 2022, and expires in December 2024. We believe that our facility is adequate for our current needs.

ITEM 3. LEGAL PROCEEDINGS

In 2021, we settled the following litigation:

- Certain putative shareholder securities class action complaints originally filed against our predecessor, Galena, in 2017 which alleged, among other things, that Galena and certain of Galena's former officers and directors failed to disclose that certain of Galena's promotional practices were allegedly improper and that these alleged failures rendered Galena's statements about its business misleading. The actions were consolidated with lead plaintiffs named by the U.S. District Court for the District of New Jersey. In 2021, we reached a settlement with the plaintiffs in this action, and which was preliminarily approved by the court and which was fully covered by our directors and officers insurance policy applicable to this case. We received final court approval on February 24, 2022.
- In March 2017, a derivative complaint was filed in the U.S. District Court for the District of New Jersey against Galena's former directors and Galena, as a nominal defendant. In July 2017, a derivative complaint was filed in California state court against Galena's former directors and Galena, as a nominal defendant. In January 2018, a derivative complaint was filed in the U.S. District Court for the District of New Jersey against Galena's former directors, officers and employees, and us as a nominal defendant. These complaints purported to assert derivative claims for breach of fiduciary duty on our behalf against our former directors and, in certain of the complaints, certain of our former officers and former employees, based on substantially similar facts as alleged in the putative shareholder securities class action complaint mentioned above. We reached a settlement with the plaintiffs in these three cases which was approved by the U.S. District Court for the District of New Jersey on November 19, 2021, and which was fully covered by our directors and officers insurance policy applicable to these cases.

ITEM 4. MINE SAFETY DISCLOSURES

Not applicable.

PART II

ITEM 5. MARKET FOR REGISTRANT'S COMMON EQUITY, RELATED STOCKHOLDER MATTERS AND ISSUER PURCHASES OF EQUITY SECURITIES

Market Information

Our common stock is listed on The Nasdaq Capital Market under the symbol SLS.

Holders

As of March 28, 2022, there were approximately 30 holders of record of our common stock. Because many of our shares are held by brokers and other institutions on behalf of stockholders, we are unable to estimate the total number of individual stockholders represented by these holders of record.

Dividends

We have never paid any cash dividends on our common stock and do not anticipate paying any cash dividends on our common stock in the foreseeable future. We expect to retain future earnings, if any, for use in our development activities and the operation of our business. The payment of any future dividends will be subject to the discretion of our Board of Directors and will depend, among other things, upon our results of operations, financial condition, cash requirements, prospects and other factors that our Board of Directors may deem relevant. Our ability to pay future dividends may be restricted by the terms of any future securities we may issue.

Recent Sales of Unregistered Securities

During the period covered by this annual report, there were no sales by us of unregistered securities that were not previously reported by us in a Quarterly Report on Form 10-Q or Current Report on Form 8-K.

Purchases of Equity Securities

During the year ended December 31, 2021, we did not purchase any of our equity securities. Our Board of Directors has not authorized any repurchase plan or program for the purchase of shares of our common stock or other securities on the open market or otherwise.

Equity Compensation Plan Information

The following table provides information regarding the status of our existing equity compensation plans as of December 31, 2021:

Plan Category	Number of Securities to be Issued upon Exercise of Outstanding Options, Warrants and Rights	Weighted Average Exercise Price of Outstanding Options, Warrants and Rights	Number of Securities Remaining Available for Future Issuance under Equity Compensation Plans (Excluding Securities Reflected in Previous Columns)
Equity compensation plans approved by security holders			
2017 Equity Incentive Plan	21,520	$ 112.85	—
2019 Equity Incentive Plan	512,250	$ 5.77	449,476
Restricted Stock Units	200,280	N/A	—
2017 Employee Stock Purchase Plan	—	N/A	11,302
2021 Employee Stock Purchase Plan	—	N/A	300,000
Equity compensation plans not approved by security holders			
None	—	—	—
Total	734,050	$ 10.09	760,778

ITEM 6. [RESERVED]

ITEM 7. MANAGEMENT'S DISCUSSION AND ANALYSIS OF FINANCIAL CONDITION AND RESULTS OF OPERATIONS

The purpose of this Management's Discussion and Analysis is to better allow our investors to understand and view our company from management's perspective. We are providing an overview of our business and strategy including a discussion of our financial condition and results of operations. You should read the following discussion in conjunction with the consolidated financial statements and the notes to the consolidated financial statements included elsewhere in this annual report on Form 10-K. This discussion contains forward-looking statements within the meaning of federal securities laws. Such forward-looking statements are subject to risks and uncertainties that could cause actual results to differ materially from those contained in such forward-looking statements, including those discussed in the section "Risk Factors" in Part I — Item 1A of this annual report on Form 10-K.

Overview

We are a late-stage clinical biopharmaceutical company focused on developing novel cancer immunotherapeutics for a broad range of cancer indications. Our product candidates currently include galinpepimut-S and nelipepimut-S.

Galinpepimut-S, or GPS

Our lead product candidate, galinpepimut-S, or GPS, is a cancer immunotherapeutic agent licensed from Memorial Sloan Kettering Cancer Center, or MSK, that targets the Wilms tumor 1, or WT1, protein, which is present in 20 or more cancer types. Based on its mechanism of action as a directly immunizing agent, GPS has potential as a monotherapy or in combination with other immunotherapeutic agents to address a broad spectrum of hematologic, or blood, cancers and solid tumor indications.

In January 2020, we commenced a Phase 3 trial, the REGAL study, for GPS monotherapy in patients with acute myeloid leukemia, or AML, in the maintenance setting after achievement of second complete remission, or CR2, following successful completion of second-line antileukemic therapy. We expect this study will be used as the basis for submission of a Biologics License Application, or BLA, subject to a statistically significant and clinically meaningful data outcome and agreement with the U.S. Food & Drug Administration, or the FDA. The REGAL study is expected to enroll approximately 116 patients at up to approximately 85 clinical sites primarily in the United States, Europe, and Asia with a planned interim safety and futility analysis after 80 events (deaths).

At the request of several investigators, we are planning to institute an Expanded Access Program that would allow qualified physicians who desire so to treat with GPS AML patients who do not meet currently required study entry criteria for the ongoing REGAL trial. The access will be provided on a case by case basis to patients in the U.S. and, potentially, Germany. Patients treated under the Expanded Access Program will not be considered participants in the REGAL study. We expect the program to commence in the second quarter of 2022.

In December 2018, we initiated a Phase 1/2 multi-arm "basket" type clinical study of GPS in combination with Merck & Co., Inc.'s anti-PD-1 therapy, Keytruda® (pembrolizumab). The tumor type currently being studied is ovarian cancer (second or third line). In February 2022, we announced that we had completed enrollment of 17 evaluable patients in this Phase 1/2 clinical trial. Data from 15 patients is expected to be examined by mid-2022, with final data analysis of all 17 evaluable patients in the study by the end of 2022.

In February 2020, a Phase I open-label investigator-sponsored clinical trial of GPS, in combination with Bristol-Myers Squibb's anti-PD-1 therapy, nivolumab (Opdivo®), in patients with malignant pleural mesothelioma, or MPM, who harbor relapsed or refractory disease after having received frontline standard of care multimodality therapy was commenced at MSK. Completion of enrollment of a target total of 10 evaluable patients is expected during the second half of 2022.

GPS was granted Orphan Drug Product Designations from the FDA, as well as Orphan Medicinal Product Designations from the European Medicines Agency, or EMA, for GPS in AML, malignant pleural mesothelioma, or MPM, and multiple myeloma, or MM, as well as Fast Track Designation for AML, MPM, and MM from the FDA.

Nelipepimut-S or NPS

Nelipepimut-S, or NPS, is a cancer immunotherapy that targets human epidermal growth factor receptor 2, or HER2, expressing cancers. We have presented data from Phase 2 studies of NPS in different types of breast cancers, which we considered to be the lead indication for NPS; however, we do not currently plan to conduct or fund a Phase 3 program for NPS. Following extensive efforts over the past four years to out-license NPS for further development in breast cancer, we have concluded that continued effort to seek a licensee for NPS for breast cancer will not result in a transaction which would provide value for the asset to us or our shareholders. We are reviewing our options for NPS.

Financial Position

At December 31, 2021, we had cash and cash equivalents of $21.4 million. We have incurred operating losses since inception and have not generated any product sales revenue or achieved profitable operations. We incurred net losses of $20.7 million and $16.8 million for the years ended December 31, 2021 and 2020, respectively. Our accumulated deficit as of December 31, 2021 was $138.6 million, and we expect to continue to incur substantial losses in future periods.

Our operating expenses will increase substantially as we continue to advance our product candidates assuming we receive sufficient funding to continue our ongoing studies and initiate our planned studies. We anticipate that our expenses will increase as we:

- complete our ongoing and planned clinical trials, including the REGAL study;
- continue the research, development and scale-up of manufacturing capabilities to optimize products and dose forms for which we may obtain regulatory approval;
- scale up manufacturing for GPS, including manufacturing validation activities;
- maintain, expand and protect our global intellectual property portfolio; and
- hire additional personnel, including clinical, manufacturing, and scientific personnel, sales and marketing personnel, and general and administrative personnel.

We intend to use our existing cash and cash equivalents for working capital and to fund the research and development of our product candidates. We believe that our existing cash and cash equivalents as of December 31, 2021 will not be sufficient to fund our current planned operating expenses for at least the next twelve months from the date of issuance of these financial statements.

Impact of COVID-19

The ongoing global COVID-19 pandemic, including the surges of cases from the Delta and Omicron variants, continues to disrupt our business operations and those of our contractors, contract research organizations, or CROs, suppliers, clinical sites, contract manufacturing organizations, or CMOs, and other partners. The COVID-19 pandemic could affect the health and availability of our workforce and that of the third-parties we rely on, such as our CROs, clinical sites, CMOs, and other contractors as well as the governmental agencies, such as the FDA and health authorities in other countries which could delay or otherwise adversely impact the ability of such parties to fulfill their obligations. We have implemented a return-to-work policy in compliance with federal, state and local requirements and guidance, which provides for a hybrid of remote and in-office work, and we operated on such a semi-virtual basis in 2021. We are continuously monitoring the impact of the pandemic on our clinical development programs. Our Phase 3 REGAL study is progressing, with the necessary work to activate additional sites in the United States and Europe continuing. However, since the onset of the COVID-19 pandemic, we have observed that, at certain times and in certain instances, clinical site initiations, patient screening and patient enrollment have been delayed. These delays are likely due to many reasons, which have been changing and evolving as the COVID-19 pandemic itself has evolved, including the prioritization of hospital resources towards the care of patients with COVID-19, delays in reviews and approvals by independent institutional review boards, or IRBs, and/or ethics committees at clinical sites, the challenges for clinicians and patients to comply with clinical trial protocols due to quarantines impeding patient movement or interrupting operations at sites, restrictions on travel and, most recently, inadequate staffing at clinical sites, supply chain-related delays, and materials shortages. Throughout the United States, Europe and Asia, newly initiated sites have taken longer than expected to become fully operational and begin enrolling patients. We have taken several steps to mitigate these actual and potential delays, including increasing the number of clinical sites from 50 to up to approximately 85, increasing the number of additional countries, both in Europe and Asia, in which sites were or will be initiated, allocating additional resources, including additional CROs and internal personnel, to the REGAL study, and making certain changes to the protocol for the study. We are continuing to monitor each clinical site through our CROs as well as conducting direct outreach to investigators and study staff through site visits investigator meetings and other modes of communication. Accordingly, due to the accumulation of these delays over the past two years, we have adjusted the projected timing of the REGAL study. The full extent to which the COVID-19 pandemic will continue to directly or indirectly impact our business, results of operations and financial condition will depend on future developments that are highly uncertain, subject to change and cannot be predicted with confidence, including the duration of the outbreak, the continued availability and efficacy of vaccines, new information which may emerge concerning the severity of COVID-19, the emergence of new variants of COVID-19, and the actions to contain COVID-19 or treat its impact, among others.

Components of Results of Operations

License Revenue

License revenue consists of revenue recognized pursuant to our Exclusive License Agreement with 3D Medicines Inc., or 3DMed, dated December 7, 2020, or the 3DMed Agreement. In the future, we may generate revenue from a combination of regulatory, development, and sales milestone payments and royalties in connection with the 3DMed Agreement.

Research and Development

Research and development expense consists of expenses incurred in connection with the discovery and development of our product candidates. We expense research and development costs as incurred. These expenses include:

- expenses incurred under agreements with CROs, as well as investigative sites and consultants that conduct our preclinical studies and clinical trials;
- manufacturing expenses;
- outsourced professional scientific development services;
- employee-related expenses, which include salaries, benefits and stock-based compensation;
- payments made under our license agreements, under which we acquired certain intellectual property;
- expenses relating to certain regulatory activities, including filing fees paid to regulatory agencies;
- laboratory materials and supplies used to support our research activities; and
- allocated expenses, utilities and other facility-related costs.

The successful development of our current and future product candidates is highly uncertain. At this time, we cannot reasonably estimate or know the nature, timing and costs of the efforts that will be necessary to complete the remainder of the development of, or when, if ever, material net cash inflows may commence from, any current or future product candidates. This uncertainty is due to the numerous risks and uncertainties associated with the duration and cost of our clinical trials, which vary significantly over the life of a project as a result of many factors, including:

- the number of clinical sites included in the trials;
- the length of time required to enroll suitable patients;
- the number of patients that ultimately participate in the trials;
- the number of doses patients receive;
- the duration of patient follow-up;
- the results of clinical trials;
- the expenses associated with manufacturing;
- the receipt of marketing approvals; and
- the commercialization of current and future product candidates.

Research and development activities are central to our business model. Cancer immunotherapy product candidates in the later stages of clinical development generally have higher development costs than those in the earlier stages of clinical development, primarily due to the increased size and duration of the later-stage clinical trials. We expect our research and development expenses to increase for the foreseeable future as we conduct and complete our ongoing early and late stage clinical trials and initiate additional clinical trials.

Our expenditures are subject to additional uncertainties, including the terms and timing of regulatory approvals. We may never succeed in achieving regulatory approval for any of our current or future product candidates. We may obtain unexpected results from our clinical trials. We may elect to discontinue, delay or modify clinical trials of some product candidates or target indications or focus on others. A change in the outcome of any of these variables with respect to the development of a product candidate could mean a significant change in the costs and timing associated with the development of that product candidate. For example, if the FDA or other regulatory authorities were to require us to conduct clinical trials beyond those that we currently anticipate, or if we experience significant delays in enrollment in any of our clinical trials, we could be required to expend significant additional financial resources and time on the completion of clinical development.

General and Administrative Expense

General and administrative expenses consist principally of salaries and related costs for personnel in executive, administrative, finance and legal functions, including stock-based compensation, travel expenses and recruiting expenses, fees for outside legal counsel, and director and officer insurance premiums. Other general and administrative expenses include facility related costs, patent filing and prosecution costs, professional fees for business development, accounting, consulting, legal and tax-related services associated with maintaining compliance with our Nasdaq listing and SEC reporting requirements, investor relations costs, and other expenses associated with being a public company.

If and when we believe that regulatory approval of a product candidate appears likely, we anticipate that an increase in general and administrative expenses will occur as a result of our preparation for commercial operations, particularly as it relates to the sales and marketing of such product candidate. Cancer immunotherapy product commercialization may take several years and millions of dollars in development costs.

In-Process Research and Development Impairment Charge

Intangible assets are comprised of identifiable in-process research and development assets, or IPR&D, and are considered indefinite-lived assets and are assessed for impairment annually or more frequently if impairment indicators are present. Our indefinite-lived intangible asset consisted of IPR&D of NPS that was acquired as part of the merger with Galena Biopharma, Inc. in 2017, or the Merger. The impairment charge recognized during the year ended December 31, 2021 was a result of the determination that the carrying amount of the IPR&D was not recoverable and was measured by the amount the carrying value exceeded its fair value.

Non-Operating Income (Expense), Net

Non-operating income (expense), net consists of changes in fair value of our warrant liability, changes in fair value of our contingent consideration, and interest income. Interest income primarily reflects the interest earned from our cash and cash equivalents.

Results of Operations for the Years Ended December 31, 2021 and 2020

The following table summarizes our results of operations for the years ended December 31, 2021 and 2020 (amounts in thousands):

	Year ended December 31,		
	2021	2020	Change
License revenue	$ 7,600	$ 1,900	$ 5,700
Operating expenses:			
Cost of license revenue	200	—	200
Research and development	15,674	9,282	6,392
General and administrative	11,320	9,600	1,720
In-process research and development charge	5,700	—	5,700
Total operating expenses	32,894	18,882	(14,012)
Loss from operations	(25,294)	(16,982)	8,312
Non-operating income, net	4,358	208	4,150
Loss before income taxes	(20,936)	(16,774)	4,162
Income tax benefit	(237)	(17)	(220)
Net loss	$ (20,699)	$ (16,757)	$ 3,942

For the year ended December 31, 2021, our net loss was $20.7 million compared with a net loss of $16.8 million for the year ended December 31, 2020. The increase of $3.9 million in net loss was primarily attributable to an increase in operating expenses of $14.0 million, driven by a $6.4 million increase in research and development expenses, a $5.7 million non-cash impairment charge of IPR&D, a $1.7 million increase in general and administrative expenses, and a $0.2 million increase in costs of license revenue. These increases in operating expenses were partially offset by a $5.7 million increase in licensing revenue, a $4.2 million increase in non-operating income, and a $0.2 million increase in income tax benefit.

Further analysis of the changes and trends in our operating results are discussed below.

License Revenue

License revenue for the year ended December 31, 2021 was $7.6 million compared to $1.9 million for the year ended December 31, 2020 and related to the out-licensing of intellectual property rights and transfer of technical know-how associated with the 3DMed Agreement for the development and commercialization of GPS in China, Hong Kong, Macau, and Taiwan.

Cost of License Revenue

We incurred $0.2 million of sublicensing fees payable under our license from MSK in connection with the 3DMed Agreement during year ended December 31, 2021. There was no cost of license revenue during the year ended December 31, 2020.

Research and Development

Research and development expenses were $15.7 million for the year ended December 31, 2021 compared to $9.3 million for the year ended December 31, 2020. As compared to the prior period, the $6.4 million increase in research and development expenses was primarily attributable to a $4.3 million increase in clinical trial expenses primarily related to our ongoing Phase 3 REGAL clinical trial of GPS in AML, a $1.7 million increase in manufacturing and drug supply costs due to the ramp up of the manufacture of clinical trial materials and registration batches of GPS, a technology transfer to a new contract manufacturer, and clinical drug supply purchase costs in the European Union as we prepared to open sites and enroll patients in European Union countries for our Phase 3 REGAL clinical trial for GPS in AML, and a $0.5 million increase in personnel related expenses due to increased headcount. These increases were partially offset by a $0.1 million decrease in other research and development expenses. We anticipate that our research and development expenses will increase in the future as we continue to advance the development of GPS, including our Phase 3 REGAL clinical trial of GPS in AML.

General and Administrative

General and administrative expenses were $11.3 million for the year ended December 31, 2021 compared to $9.6 million for the year ended December 31, 2020. The $1.7 million increase was primarily driven by a $1.1 million amortization expense of our contract asset associated with the 3DMed License Agreement and a $0.9 million increase in personnel related expenses, including a $0.3 million increase in non-cash stock-based compensation. These increases were partially offset by a $0.3 million decrease in other general and administrative expenses.

In-Process Research and Development Impairment Charge

In the fourth quarter of 2021, we performed an annual impairment analysis of our IPR&D. The impairment charge recognized during the year ended December 31, 2021 was in connection with our determination that consummating an out-licensing transaction of NPS for further development in breast cancer was unlikely and taking into account the deferred development timelines and a lower probability of success associated with earlier stages of clinical development for the potential development of NPS in other oncology indications. The Company determined that the carrying amount of the IPR&D associated with NPS exceeded the fair value and recorded a $5.7 million impairment charge during the year ended December 31, 2021.

Non-Operating Income, Net

Non-operating income, net for the years ended December 31, 2021 and 2020, respectively, was as follows (in thousands):

	Years Ended December 31,		
	2021	2020	Change
Change in fair value of warrant liability	$ 15	$ (97)	$ 112
Change in fair value of contingent consideration	4,337	279	4,058
Interest income	6	26	(20)
Total non-operating income, net	$ 4,358	$ 208	$ 4,150

The increase in our net non-operating income during the year ended December 31, 2021 compared to the year ended December 31, 2020 was primarily due to a $4.1 million increase in the change in fair value of contingent consideration, and a $0.1 million increase in the change in the fair value of liability-classified warrants to acquire shares of our common stock. The change in estimated fair value of contingent consideration is driven by changes in discount periods and rates, changes in the timing of development milestones achieved and changes in probability assumptions with respect to the likelihood of achieving the various earnout criteria. The $4.3 million change in fair value of the contingent consideration during the year ended December 31, 2021 related to the inability to execute an out-licensing transaction of NPS for further development in breast cancer and reflected adjusted assumptions of deferred development timelines and a lower probability of success, associated with earlier stages of clinical development, for the potential development of NPS in other oncology indications. The change in the estimated fair value of our warrant liability was primarily due to the changes in our common stock price.

Interest income for the years ended December 31, 2021 and 2020 consists of nominal interest earned from our cash and cash equivalents. The changes in fair value of warrant liability and changes in fair value of contingent consideration are all non-cash in nature.

Income Tax Benefit

For the year ended December 31, 2021, we recognized an income tax benefit of $0.2 million, primarily related to the intangible asset impairment charge. For the year ended December 31, 2020, we recognized a de minimis income tax benefit.

Liquidity and Capital Resources

We have not generated any revenue from product sales in the years ended December 31, 2021 and 2020. Since inception, we have incurred net losses, used net cash from our operations, and have funded substantially all of our operations through proceeds from the sale of debt and equity securities. During the year ended December 31, 2021, we incurred a net loss of $20.7 million, used $26.0 million of cash in operations, and had an accumulated deficit of $138.6 million as of December 31, 2021. We continue to expect to generate operating losses and negative cash flows for the next few years and we will need additional funding to support our planned operating activities through profitability. The transition to profitability is dependent upon the successful development, approval, and commercialization of our product candidates and the achievement of a level of revenues adequate to support our cost structure. As of December 31, 2021, we had cash and cash equivalents of $21.4 million. We expect that our cash and cash equivalents will not be sufficient to fund our current planned operations for at least the next twelve months from the date of issuance of these financial statements. These conditions give rise to a substantial doubt over our ability to continue as a going concern.

Our consolidated financial statements do not include any adjustments related to the recoverability and classification of recorded asset amounts or the amounts and classification of liabilities that might result from the outcome of this uncertainty. We anticipate incurring additional losses until such time, if ever, that we can generate significant sales of any current or future product candidates in development. This going concern assumption is based on management's assessment of the sufficiency of our current and future sources of liquidity considering whether or not it is probable we will be able to meet our obligations as they become due for at least one year from the date our consolidated financial statements are available to be issued, and if not, whether our liquidation is imminent.

On April 16, 2021, the Company entered into a Controlled Equity Offering^{SM} Sales Agreement, or the Sales Agreement, with Cantor Fitzgerald & Co., or the Agent. From time to time during the term of the Sales Agreement, we may offer and sell shares of common stock having an aggregate offering price up to a total of $50.0 million in gross proceeds. The Agent will collect a fee equal to 3% of the gross sales price of all shares of common stock sold. Shares of common stock sold under the Sales Agreement are offered and sold pursuant to our registration statement on Form S-3, which was filed with the SEC on April 16, 2021 and declared effective on April 29, 2021. During the year ended December 31, 2021, we sold 786,927 shares of common stock pursuant to the Sales Agreement at an average price of $12.04 per share for aggregate net proceeds of approximately $9.0 million. Other than the Sales Agreement, we currently do not have any commitments to obtain additional funds.

During the year ended December 31, 2021, we received $3.1 million from the exercise of warrants to acquire shares of common stock.

During the year ended December 31, 2021, we received $2.0 million from milestones achieved pursuant to the 3DMed Agreement. In January 2022, we announced that an IND application for a small Phase I clinical trial investigating safety of GPS in China was accepted by China's National Medical Products Administration, or the NMPA. On March 30, 2022, the IND was approved by the NMPA triggering a $1.0 million milestone payment to the Company which is expected to be received in the second quarter of 2022. 3D Medicines expects to initiate the trial by mid-2022 and will be responsible for all expenses related to executing the trial in China. The current clinical development plan provides for initiation of a Phase II clinical trial following receipt of satisfactory safety data from the Phase I study; the initiation of the Phase II study will also trigger a milestone payment to us which we expect will occur in the second half of 2022. Total remaining potential milestone payments to us under the 3DMed Agreement between total $192.5 million, not including future royalties.

We will require substantial additional financing to develop any current or future product candidates. Alternatively, we will be required to scale back our plans and place certain activities on hold. Other than the Sales Agreement, we currently do not have any commitments to obtain additional funds, and may be unable to obtain sufficient funding in the future on acceptable terms, if at all. Our management continues to evaluate different strategies to obtain the required funding for future operations. These strategies may include utilizing the Sales Agreement, public and private placements of equity and/or debt securities, payments from potential strategic research and development collaborations, and licensing and/or marketing arrangements with pharmaceutical companies. Additionally, we continue to pursue discussions with global and regional pharmaceutical companies for licensing and/or co-development rights to our late- and early-stage pipeline candidates. There can be no assurance that these future funding efforts will be successful. If we cannot obtain the necessary funding, we will need to delay, scale back or eliminate some or all of our research and development programs; consider other various strategic alternatives, including a merger or sale; or cease operations.

Our future operations are highly dependent on a combination of factors, including (i) the timely and successful completion of additional financing, (ii) our ability to complete revenue-generating partnerships with pharmaceutical companies, (iii) the success of our research and development activities, (iv) the development of competitive therapies by other biotechnology and pharmaceutical companies, and, ultimately, (v) regulatory approval and market acceptance of our proposed future products.

The following table provides a reconciliation of the components of cash, cash equivalents, restricted cash, and restricted cash equivalents reported in our consolidated balance sheets to the total of the amount presented in the consolidated statements of cash flows (in thousands):

	December 31,	
	2021	2020
Cash and cash equivalents	$ 21,355	$ 35,302
Restricted cash and cash equivalents	100	100
Total cash, cash equivalents, restricted cash, and restricted cash equivalents	$ 21,455	$ 35,402

Restricted cash and cash equivalents of $0.1 million as of December 31, 2021 and 2020 related to certificates of deposit maintained on hand with our financial institutions as collateral for our corporate credit cards.

Cash Flows

The following table summarizes our cash flows from operating, investing, and financing activities for the years ended December 31, 2021 and 2020 (in thousands):

	For the December 31,	
	2021	2020
Net cash (used in) provided by:		
Operating activities	$ (26,021)	$ (10,417)
Financing activities	12,074	38,442
Net increase (decrease) in cash, cash equivalents, restricted cash, and restricted cash equivalents	$ (13,947)	$ 28,025

Net Cash Flow from Operating Activities

Net cash used in operating activities of $26.0 million during the year ended December 31, 2021 was primarily attributable to our net loss of $20.7 million and a change in our operating assets and liabilities of $7.6 million, which was partially offset by various net non-cash charges of $2.3 million. The net change in our operating assets and liabilities is primarily attributable to a decrease in deferred revenue of $5.6 million, a decrease in accounts payable and accrued expenses and other current liabilities of $1.8 million, a $1.1 million increase in prepaid expenses and other assets primarily for clinical trial costs, and a $0.2 million decrease in operating lease liabilities, which were partially offset by a $1.1 million decrease in contract acquisition costs related to the out-licensing of intellectual property rights and transfer of technical know-how associated with the 3DMed License Agreement.

Net cash used in operating activities of $10.4 million during the year ended December 31, 2020 was primarily attributable to our net loss of $16.8 million. This amount was offset by a change in our operating assets and liabilities of $5.9 million and various net non-cash charges of $0.5 million These noncash charges were comprised of $0.6 million in non-cash stock-based compensation expense and $0.2 million in other noncash charges. These amounts were partially offset by a gain of $0.3 million from the decrease in the fair value of our contingent consideration liability. The net change in our operating assets and liabilities is primarily attributable to an increase in deferred revenue related to our 3DMed License Agreement.

Net Cash Flow from Financing Activities

We generated $12.1 million of net cash from financing activities for the year ended December 31, 2021, which was primarily attributable to $9.0 million in net proceeds from the issuance of common stock under the Sales Agreement and $3.1 million in net proceeds from the exercise of warrants to acquire shares of common stock.

We generated $38.4 million of net cash from financing activities for the year ended December 31, 2020, which was primarily attributable to $29.9 million in net proceeds from the sale of common stock, common stock pre-funded warrants, and common stock warrants and $8.5 million in net proceeds from the exercise of warrants to acquire shares of common stock.

Contractual Obligations and Other Commitments

Leases

Our lease commitments reflect payments due for our lease agreement for office space at the premises that expire in December 2024 in New York, New York. As of December 31, 2021, our contractual commitments for our lease was $1.5 million, which will be paid over the term of the lease. The amount of lease commitments reflects payments due for additional premises under an amendment to our lease agreement that had not commenced as of December 31, 2021, and as a result, our future lease payments as of December 31, 2021 was $1.0 million. On February 21, 2022, the Company took possession of the additional premises and the lease amendment commenced. For additional information on our leases and timing of future payments, please read Note 8, Leases, to the consolidated financial statements included in this Form 10-K.

Other Commitments

We acquire product candidates still in development and enter into research and development arrangements with third parties that often require milestone and royalty payments to the third-party contingent upon the occurrence of certain future events linked to the success of the product candidate in development. Milestone payments may be required, contingent upon the successful achievement of an important point in the development life-cycle of the pharmaceutical product (e.g., approval of the product for marketing by a regulatory agency). We also typically have to make royalty payments based upon a percentage of the sales of the product candidate in the event that regulatory approval for marketing is obtained. Because of the contingent nature of these payments, they are not included in the table of contractual obligations.

These arrangements may be material individually and in the event that multiple milestones are reached in the same period, the aggregate charge to expense could be material to the results of operations in any one period. In addition, these arrangements often give us the discretion to terminate development of the product candidate, which would allow us to avoid making the contingent payments; however, we are unlikely to cease development if the product candidate successfully achieves clinical testing objectives.

We enter into contracts in the normal course of business with various third parties for clinical trials, manufacturing, and other services and products for operating purposes. These contracts provide for termination upon notice. Payments due upon cancellation generally consist only of payments for services provided or expenses incurred, including non-cancellable obligations of our service providers, up to the date of cancellation. These payments have not been included separately within these contractual and other obligations disclosures.

Critical Accounting Policies and Estimates

Our consolidated financial statements are prepared in accordance with U.S. generally accepted accounting principles. The preparation of our consolidated financial statements and related disclosures requires our management to make estimates and judgments that affect the reported amounts of assets and liabilities, disclosure of contingent assets and liabilities at the date of the consolidated financial statements, and the reported amounts of revenues and expenses during the reported period. We base such estimates on historical experience, known trends and events and various other factors that are believed to be reasonable under the circumstances, the results of which form the basis for making judgments about the carrying values of assets and liabilities that are not readily apparent from other sources. We evaluate our estimates and assumptions on an ongoing basis. Our actual results may differ from these estimates under different assumptions and conditions.

While our significant accounting policies are described in more detail in the notes to our audited consolidated financial statements appearing elsewhere in this annual report on Form10-K, we believe that the following accounting policies are those most critical to the judgments and estimates used in the preparation of our consolidated financial statements.

Revenue Recognition

We record revenue in accordance with ASC Topic 606, *Revenue From Contracts with Customers*. This standard applies to all contracts with customers, except for contracts that are within the scope of other standards, such as leases, insurance, collaboration arrangements and financial instruments. Under Topic 606, an entity recognizes revenue when its customer obtains control of promised goods or services, in an amount that reflects the consideration that the entity expects to receive in exchange for those goods or services. To determine revenue recognition for arrangements that an entity determines are within the scope of Topic 606, the entity performs the following five steps: (i) identify the contract(s) with a customer; (ii) identify the performance obligations in the contract; (iii) determine the transaction price; (iv) allocate the transaction price to the performance obligations in the contract; and (v) recognize revenue when (or as) the entity satisfies a performance obligation. We only apply the five-step model to contracts when it is probable that we will collect the consideration we are entitled to in exchange for the goods or services we transfer to the customer. At contract inception, once the contract is determined to be within the scope of Topic 606, we assess the goods or services promised within each contract and determine those that are performance obligations, and we assess whether each promised good or service is distinct. We then recognize as revenue the amount of the transaction price that is allocated to the respective performance obligation when (or as) the performance obligation is satisfied.

Development, Regulatory and Sales Milestones and Other Payments

At the inception of each arrangement that includes regulatory or development milestone payments, we evaluate whether the milestones are considered probable of being achieved and estimate the amount to be included in the transaction price using the most likely amount method. If it is probable that a significant revenue reversal would not occur, the associated milestone value is included in the transaction price. Milestone payments that are not within the control of us or the licensee, such as regulatory approvals, are not considered probable of being achieved until those approvals are received. We evaluate factors such as the scientific, clinical, regulatory, commercial, and other risks that must be overcome to achieve the particular milestone in making this assessment. There is considerable judgment involved in determining whether it is probable that a significant revenue reversal would not occur. At the end of each subsequent reporting period, we reevaluate the probability of achievement of all milestones subject to constraint and, if necessary, adjust our estimate of the overall transaction price. Any such adjustments are recorded on a cumulative catch-up basis, which would affect revenues and earnings in the period of adjustment.

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

Valuation of Intangible Assets

Intangible assets are comprised of identifiable IPR&D acquired in conjunction with the completion of the Merger and are considered indefinite-lived intangible assets and are assessed for impairment annually during the fourth quarter of each fiscal year or more frequently if impairment indicators exist.

The identifiable intangible assets are measured at their respective fair values as of the acquisition date and may be subject to revision within the measurement period, which may be up to one year from the acquisition date. The models used in valuing these intangible assets require the use of significant estimates and assumptions including but not limited to:

- estimates of revenue and operating profits related to products or product candidates;
- the probability of success for unapproved product candidates considering their stages of development;
- the time and resources needed to complete the development and approval of product candidates;
- the life of the potential commercialized products and associated risks, including the inherent difficulties and uncertainties in developing a product candidate such as obtaining FDA and other regulatory approvals; and
- risks related to the viability of and potential alternative treatments in any future target markets.

We believe that the fair values used to record intangible assets acquired in connection with a business combination use information known and knowable, and are based upon reasonable estimates and assumptions given the facts and circumstances as of the related valuation dates.

Intangible assets related to IPR&D are considered to be indefinite-lived until the completion or abandonment of the associated research and development efforts. If and when development is complete, which generally occurs if and when regulatory approval to market a product is obtained, the associated assets would be deemed finite-lived and would then be amortized based on their respective estimated useful lives at that point in time. During the period the assets are considered indefinite-lived, they are not amortized but are tested for impairment on an annual basis as well as between annual tests if we become aware of any events or changes that would indicate that it is more likely than not that the fair value of the IPR&D is below their respective carrying amounts. The fair value of our indefinite-lived intangible assets is dependent on assumptions such as the expected timing or probability of achieving the specified milestones, changes in projected revenues or changes in discount rates. Significant judgment is employed in determining these assumptions and changes to our assumptions could have a significant impact on our results of operations in any given period.

When performing our impairment assessment, we calculate the fair value using the same methodology as described above. If the carrying value of our IPR&D exceeds its fair value, then the intangible asset is written down to its fair value. Changes in estimates and assumptions used in determining the fair value of our IPR&D could result in an impairment. Impairment charges are recorded within our consolidated statements of operations. Based on our most recent impairment assessment we incurred a $5.7 million impairment charge for the year ended December 31, 2021, mainly related to our determination that the execution of an out-licensing transaction of NPS for further development in breast cancer was unlikely and taking into account the deferred development timelines and a lower probability of success associated with earlier stages of clinical development for the potential development of NPS in other oncology indications. See Note 4, *Goodwill and Intangible Assets*, to our consolidated financial statements included in this report.

Goodwill

Goodwill is the excess of the cost of an acquired entity over the net amounts assigned to tangible and intangible assets acquired and liabilities assumed. Goodwill is not amortized but is subject to an annual impairment test. We have a single reporting unit and all goodwill relates to that reporting unit.

We perform our annual goodwill impairment test at the reporting unit level on October 1 of each fiscal year or more frequently if changes in circumstances or the occurrence of events suggest that an impairment exists. Goodwill is evaluated for impairment using the simplified test of goodwill impairment as defined by the Financial Accounting Standards Board, or FASB, Accounting Standards Update, or ASU, No. 2017-04. Under the guidance, goodwill impairment is measured by the amount by which the carrying value of a reporting unit exceeds its fair value, without exceeding the carrying amount of goodwill allocated to that reporting unit. If the fair value of the reporting unit is less than its carrying value, an impairment loss is recorded to the extent that the implied fair value of the reporting unit's goodwill is less than the carrying value of the reporting unit's goodwill. We did not recognize any impairment of goodwill during the years ended December 31, 2021 and 2020.

Accrued Research and Development Expenses

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

- Vendors in connection with clinical development activities;
- the production of clinical trial materials;
- CROs in connection with clinical trials; and
- investigative sites in connection with clinical trials.

We base our expenses related to clinical trials on our estimates of the services received and efforts expended pursuant to quotes and contracts with multiple research institutions and CROs that conduct and manage preclinical studies and 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. There may be instances in which payments made to our vendors will exceed the level of services provided and result in a prepayment of the expense. Payments under some of these contracts depend on factors such as the successful enrollment of patients and the completion of clinical trial milestones. In accruing service fees, we estimate the time period over which services will be performed and the level of effort to be expended in each period. If the actual timing of the performance of services or the level of effort varies from the estimate, we adjust the accrual or prepaid accordingly. Although we do not expect its estimates to be materially different from amounts actually incurred, our understanding of the status and timing of services performed relative to the actual status and timing of services performed may vary and may result in reporting amounts that are too high or too low in any particular period. To date, we have not made any material adjustments to our prior estimates of accrued research and development expenses.

Valuation of Contingent Consideration

Acquisitions may include contingent consideration payments based on the achievement of certain future events. Contingent consideration is required to be recognized at fair value as of the acquisition date. The obligations for such contingent consideration payments are recorded at fair value on the acquisition date. The contingent consideration obligations are then evaluated each reporting period. Changes in the fair value of contingent consideration, other than changes due to payments, are recognized as a gain or loss and recorded within the change in the fair value of contingent consideration in the consolidated statements of operations. The fair value of development and regulatory milestones are estimated utilizing a probability adjusted, discounted cash flow approach. The fair value of net sales milestones is based on probability adjusted sales estimates and estimated discount rates and utilizes an option pricing model with *Monte Carlo* simulation to simulate a range of possible payment scenarios, and the average of the payments in these scenarios is then discounted to calculate present fair value. During the fourth quarter of 2021, we changed the valuation technique of net sales milestones from a probability adjusted, discounted cash flow approach to the option pricing model with *Monte Carlo* simulation.

The discount rates are an estimated measure of credit risk associated with the years of expected payments based on the current development stage of the product candidate, our specific development plan for that product candidate adjusted for the probability of completing the stages of development and when the contingent payments would be triggered. In estimating the probability of success, we utilize data regarding similar milestone events from several sources, including industry studies and the Company's experience. The fair value of the contingent consideration is classified as a Level 3 liability as the valuation requires substantial judgment and estimation of factors that are not currently observable in the market. If different assumptions were used for the various inputs to the valuation, including but not limited to, assumptions involving the probability of success, estimated discount rate, and projected years of payment, the estimated fair value could be significantly higher or lower than the fair value determined.

Stock-Based Compensation

We account for stock-based compensation by estimating the fair value of each stock option on the date of grant using the Black-Scholes model. We recognize stock-based compensation expense on a straight-line basis over the vesting term. The Black-Scholes model requires us to make certain assumptions regarding: (i) the expected volatility in the market price of our shares; (ii) dividend yield; (iii) risk-free interest rates; and (iv) the period of time employees are expected to hold the award prior to exercise (referred to as the expected holding period). As a result, if we revise our assumptions and estimates, our stock-based compensation expense could change.

Given our limited history as a publicly traded company following the Merger on December 29, 2017, we did not have sufficient trading data to calculate volatility based on our own common stock, and the expected volatility was calculated as of each grant date based on our own implied volatility in combination with a peer group of publicly traded companies. The expected term of the stock options was determined based upon the simplified approach for employees, allowed under SEC Staff Accounting Bulletin No. 110, which assumes that the stock options will be exercised evenly from vesting to expiration. As data associated with future exercises is obtained, the expected term of future grants will be adjusted accordingly. For non-employee awards, we use the remaining contractual term.

We measure compensation for restricted stock units, or RSUs, based on the price of our shares at the grant date and we recognize the expense on a straight-line basis over the vesting period. The expense relating to RSUs that contain both a service and a performance condition is estimated and adjusted on a quarterly basis based upon our assessment of the probability that the performance condition would be met. As a result, if we revise such assessment, our stock-based compensation expense could change.

Recent Accounting Pronouncements Adopted

In December 2019, the FASB issued ASU 2019-12, *Income Taxes (Topic 740):Simplifying the Accounting for Income Taxes* which, among other things, eliminates certain exceptions in the current rules regarding the approach for intra-period tax allocations and the methodology for calculating income taxes in an interim period, and clarifies the accounting for transactions that result in a step-up in the tax basis of goodwill. The standard was adopted by the Company on January 1, 2021. This new standard did not have a material impact on the Company's consolidated financial statements.

Recent Accounting Standards Not Yet Adopted

In August 2020, the FASB issued ASU No. 2020-06, *Debt—Debt with Conversion and Other Options (Subtopic 470-20) and Derivatives and Hedging—Contracts in Entity's Own Equity (Subtopic 815-40): Accounting for Convertible Instruments and Contracts in an Entity's Own Equity* which, among other things, simplifies the accounting models for the allocation of proceeds attributable to the issuance of a convertible debt instrument. As a result, after adopting the ASU's guidance, entities will not separately present in equity an embedded conversion feature in such debt. Instead, they will account for a convertible debt instrument wholly as debt, and for convertible preferred stock wholly as preferred stock (i.e., as a single unit of account), unless (i) a convertible instrument contains features that require bifurcation as a derivative under ASC 815 or (ii) a convertible debt instrument was issued at a substantial premium. The standard becomes effective for the Company in the first quarter of 2024 and early adoption is permitted. The Company is currently evaluating the potential impact of the adoption of this standard on its consolidated financial statements.

In May 2021, ASU No. 2021-04, *Issuer's Accounting for Certain Modifications of Exchanges of Freestanding Equity-Classified Written Call Options* was issued to clarify the accounting for modifications or exchanges of freestanding equity-classified written call options, such as warrants to acquire shares of common stock, that remain equity classified after modification or exchange. This ASU became effective for the Company on January 1, 2022 and is not expected to have a material impact on the consolidated financial statements.

ITEM 7A. QUANTITATIVE AND QUALITATIVE DISCLOSURES ABOUT MARKET RISK

The primary objective of our investment activities is to preserve capital. We do not utilize hedging contracts or similar instruments.

We are exposed to certain market risks relating primarily to interest rate risk on our cash and cash equivalents and risks relating to the financial viability of the institutions which hold our capital and through which we have invested our funds. We manage such risks by investing primarily in money market mutual funds.

In addition, we are exposed to foreign currency exchange rate fluctuations relating to payments we make to certain vendors and suppliers and license partners using foreign currencies. We do not hedge against foreign currency risks. Consequently, changes in exchange rates could adversely affect our operating results and stock price. Such losses have not been significant to date.

ITEM 8. FINANCIAL STATEMENTS AND SUPPLEMENTARY DATA

REPORT OF INDEPENDENT REGISTERED PUBLIC ACCOUNTING FIRM

To the Stockholders and the Board of Directors of
SELLAS Life Sciences Group, Inc.

Opinion on the Financial Statements

We have audited the accompanying consolidated balance sheets of SELLAS Life Sciences Group, Inc. (the "Company") as of December 31, 2021 and 2020, the related consolidated statements of operations, stockholders' equity and cash flows for the years then ended, and the related notes (collectively referred to as the "consolidated financial statements"). In our opinion, the consolidated financial statements present fairly, in all material respects, the consolidated financial position of the Company as of December 31, 2021 and 2020, and the consolidated results of its operations and its cash flows for the years then ended, in conformity with accounting principles generally accepted in the United States of America.

Going Concern Uncertainty

The accompanying consolidated financial statements have been prepared assuming that the Company will continue as a going concern. As discussed in Note 2 to the consolidated financial statements, the Company has suffered recurring losses from operations and has a net capital deficiency that raise substantial doubt about its ability to continue as a going concern. Management's plans in regard to these matters are also described in Note 2. The consolidated financial statements do not include any adjustments that might result from the outcome of this uncertainty.

Basis for Opinion

These consolidated financial statements are the responsibility of the Company's management. Our responsibility is to express an opinion on the Company's consolidated financial statements based on our audits. We are a public accounting firm registered with the Public Company Accounting Oversight Board (United States) ("PCAOB") and are required to be independent with respect to the Company in accordance with the U.S. federal securities laws and the applicable rules and regulations of the Securities and Exchange Commission and the PCAOB.

We conducted our audits in accordance with the standards of the PCAOB. Those standards require that we plan and perform the audit to obtain reasonable assurance about whether the consolidated 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 consolidated financial statements, whether due to error or fraud, and performing procedures to respond to those risks. Such procedures included examining, on a test basis, evidence regarding the amounts and disclosures in the consolidated 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 consolidated financial statements. We believe that our audits provide a reasonable basis for our opinion.

Critical Audit Matters

Critical audit matters are matters arising from the current period audit of the consolidated 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 consolidated financial statements and (2) involved our especially challenging, subjective, or complex judgments. We determined that there are no critical audit matters.

/s/ Moss Adams LLP

San Francisco, California
March 31, 2022

We have served as the Company's auditor since 2018.

SELLAS LIFE SCIENCES GROUP, INC.
CONSOLIDATED BALANCE SHEETS
(Amounts in thousands, except share and per share data)

	December 31, 2021	December 31, 2020
ASSETS		
Current assets:		
Cash and cash equivalents	$ 21,355	$ 35,302
Restricted cash and cash equivalents	100	100
Contract asset	—	1,128
Prepaid expenses and other current assets	1,589	395
Total current assets	23,044	36,925
Operating lease right-of-use asset	723	896
In-process research and development	—	5,700
Goodwill	1,914	1,914
Deposits and other assets	594	614
Total assets	$ 26,275	$ 46,049
LIABILITIES AND STOCKHOLDERS' EQUITY		
Current liabilities:		
Accounts payable	$ 2,144	$ 4,657
Accrued expenses and other current liabilities	2,640	1,913
Operating lease liability	198	166
Deferred revenue	—	5,600
Total current liabilities	4,982	12,336
Operating lease liability, non-current	610	825
Deferred tax liability	—	239
Warrant liability	40	55
Contingent consideration	296	4,633
Total liabilities	5,928	18,088
Commitments and contingencies (Note 8)		
Stockholders' equity:		
Preferred stock, $0.0001 par value; 5,000,000 shares authorized; Series A convertible preferred stock, 17,500 shares designated; 0 shares issued and outstanding at December 31, 2021 and 2020	—	—
Common stock, $0.0001 par value; 350,000,000 shares authorized, 15,895,637 and 14,254,554 shares issued and outstanding at December 31, 2021 and 2020, respectively	2	1
Additional paid-in capital	158,948	145,864
Accumulated deficit	(138,603)	(117,904)
Total stockholders' equity	20,347	27,961
Total liabilities and stockholders' equity	$ 26,275	$ 46,049

See accompanying notes to these consolidated financial statements.

SELLAS LIFE SCIENCES GROUP, INC.
CONSOLIDATED STATEMENTS OF OPERATIONS
(Amounts in thousands, except share and per share data)

	Year Ended December 31,	
	2021	2020
Licensing revenue	$ 7,600	$ 1,900
Operating expenses:		
Cost of revenue	200	—
Research and development	15,674	9,282
General and administrative	11,320	9,600
In-process research and development impairment charge	5,700	—
Total operating expenses	32,894	18,882
Loss from operations	(25,294)	(16,982)
Non-operating income (expense):		
Change in fair value of warrant liability	15	(97)
Change in fair value of contingent consideration	4,337	279
Interest income, net	6	26
Total non-operating income, net	4,358	208
Loss before income taxes	(20,936)	(16,774)
Income tax benefit	(237)	(17)
Net loss	(20,699)	(16,757)
Deemed dividend arising from warrant modifications	—	(78)
Net loss attributable to common stockholders	$ (20,699)	$ (16,835)
Per share information:		
Net loss per common share attributable to common stockholders, basic and diluted	$ (1.34)	$ (2.11)
Weighted-average common shares outstanding, basic and diluted	15,481,113	7,977,104

See accompanying notes to these consolidated financial statements.

SELLAS LIFE SCIENCES GROUP, INC.
CONSOLIDATED STATEMENT OF STOCKHOLDERS' EQUITY
(Amounts in thousands, except share amounts)

	Common Stock		Additional Paid-In Capital	Accumulated Deficit	Total Stockholders' Equity
	Shares	Amount			
Balance at January 1, 2020	5,080,100	$ 1	$ 107,239	$ (101,147)	$ 6,093
Issuance of common stock and common stock warrants, net of issuance costs	6,253,078	—	29,418	—	29,418
Issuance of common stock for exercise of warrants	2,472,576	—	8,625	—	8,625
Issuance of common stock upon exercise of pre-funded warrants	448,800	—	4	—	4
Stock-based compensation	—	—	578	—	578
Net loss	—	—	—	(16,757)	(16,757)
Balance at December 31, 2020	14,254,554	1	145,864	(117,904)	27,961
Issuance of common stock, net of issuance costs	786,927	—	9,005	—	9,005
Issuance of common stock for exercise of warrants	844,061	1	3,068	—	3,069
Vesting of restricted stock units	10,095	—	—	—	—
Stock-based compensation	—	—	1,011	—	1,011
Net loss	—	—	—	(20,699)	(20,699)
Balance at December 31, 2021	15,895,637	$ 2	$ 158,948	$ (138,603)	$ 20,347

See accompanying notes to these consolidated financial statements.

SELLAS LIFE SCIENCES GROUP, INC.
CONSOLIDATED STATEMENTS OF CASH FLOWS
(Amounts in thousands)

	Year ended December 31,	
	2021	2020
Cash flows from operating activities:		
Net loss	$ (20,699)	$ (16,757)
Adjustment to reconcile net loss to net cash used in operating activities:		
Non-cash in-process research and development impairment charge	5,700	—
Non-cash stock-based compensation	1,011	578
Non-cash lease expense	173	95
Change in fair value of contingent consideration	(4,337)	(279)
Change in fair value of common stock warrants	(15)	97
Deferred income taxes	(239)	(23)
Changes in operating assets and liabilities:		
Contract asset	1,128	282
Prepaid expenses and other assets	(1,174)	84
Accounts payable	(2,513)	(836)
Accrued expenses and other current liabilities	727	742
Operating lease liabilities	(183)	—
Deferred revenue	(5,600)	5,600
Net cash used in operating activities	(26,021)	(10,417)
Cash flows from financing activities:		
Proceeds from issuance of common stock, net of issuance costs	9,005	29,599
Proceeds from exercise of warrants	3,069	8,535
Collection of stock subscription receivable	—	308
Net cash provided by financing activities	12,074	38,442
Net increase (decrease) in cash, cash equivalents, restricted cash, and restricted cash equivalents	(13,947)	28,025
Cash, cash equivalents, restricted cash, and restricted cash equivalents at the beginning of year	35,402	7,377
Cash, cash equivalents, restricted cash, and restricted cash equivalents at the end of year	$ 21,455	$ 35,402
Supplemental disclosure of cash flow information:		
Cash received during the year for interest	$ 6	$ 26
Supplemental disclosures:		
Contract asset within accounts payable	$ —	$ 1,410
Reclassification of warrant liabilities upon exercise	$ —	$ 94
Deferred offering costs included in accounts payable and accrued expenses	$ —	$ 181
Right-of-use assets recorded	$ —	$ 976

See accompanying notes to these consolidated financial statements.

1. Organization and Description of Business

SELLAS Life Sciences Group, Inc. (the "Company" or "SELLAS") is a late-stage clinical biopharmaceutical company focused on novel cancer immunotherapeutics for a broad range of cancer indications. SELLAS' lead product candidate, galinpepimut-S ("GPS"), is licensed from Memorial Sloan Kettering Cancer Center ("MSK") and targets the Wilms Tumor 1 ("WT1") protein, which is present in an array of tumor types. GPS has potential as a monotherapy or in combination to address a broad spectrum of hematologic malignancies and solid tumor indications. SELLAS' second product candidate, nelipepimut-S ("NPS"), is a HER2-directed cancer immunotherapy.

As used in this Annual Report on Form 10-K, the words the "Company," and "SELLAS" refer to SELLAS Life Sciences Group, Inc. and its consolidated subsidiaries following the completion of the business combination with Galena Biopharma, Inc., a Delaware corporation ("Galena"), and SELLAS Life Sciences Group, Ltd., a privately held Bermuda exempted company ("Private SELLAS") in December 2017. This business combination is referred to as the Merger. Upon completion of the Merger, the Company's name changed from "Galena Biopharma, Inc." to "SELLAS Life Sciences Group, Inc." and the Company's financial statements became those of Private SELLAS.

2. Liquidity and Going Concern

The accompanying consolidated financial statements have been prepared on a going concern basis, which contemplates the realization of assets and the satisfaction of liabilities in the normal course of business. The accompanying consolidated financial statements do not reflect any adjustments relating to the recoverability and reclassifications of assets and liabilities that might be necessary if the Company is unable to continue as a going concern. The Company expects its costs and expenses to increase as it continues to develop its product candidates and progress its current and planned clinical programs.

Pursuant to the requirements of Accounting Standard Codification ("ASC") 205-40, *Disclosure of Uncertainties about an Entity's Ability to Continue as a Going Concern*, management must evaluate whether there are conditions or events, considered in the aggregate, that raise substantial doubt about the Company's ability to continue as a going concern within one year after the date that the consolidated financial statements are issued. This evaluation initially does not take into consideration the potential mitigating effect of management's plans that have not been fully implemented as of the date these financial statements are issued, but will consider such plans if (1) it is probable that the plans will be effectively implemented within one year after the date the financial statements are issued, and (2) it is probable that the plans, when implemented, will mitigate the relevant condition or events that raise substantial doubt about the entity's ability to continue as a going concern within one year after the date the consolidated financial statements are issued. Certain elements of the Company's operating plan to alleviate the conditions that raise substantial doubt are outside of the Company's control and cannot be included in management's evaluation under the requirements of Accounting Standard Codification (ASC) 205-40.

Since inception, the Company has incurred recurring losses and negative cash flows from operations and has an accumulated deficit of $138.6 million as of December 31, 2021. During the year ended December 31, 2021, the Company incurred a net loss of $20.7 million and used $26.0 million of cash in operations. The Company continues to expect to generate operating losses and negative cash flows for the next few years and will need additional funding to support its planned operating activities through profitability. The transition to profitability is dependent upon the successful development, approval, and commercialization of the Company's product candidates and the achievement of a level of revenues adequate to support its cost structure. As of December 31, 2021, the Company had cash and cash equivalents of $21.4 million. The Company expects its cash and cash equivalents will not be sufficient to fund its current planned operations for at least the next twelve months from the date of issuance of these financial statements. These conditions give rise to a substantial doubt over the Company's ability to continue as a going concern. These consolidated financial statements do not include any adjustments related to the recoverability and classification of recorded asset amounts or the amounts and classification of liabilities that might result from the outcome of this uncertainty.

On April 16, 2021, the Company entered into a Controlled Equity Offering℠ Sales Agreement, or the Sales Agreement, with Cantor Fitzgerald & Co., or the Agent. From time to time during the term of the Sales Agreement, the Company may offer and sell shares of common stock having an aggregate offering price up to a total of $50.0 million in gross proceeds. The Agent will collect a fee equal to 3% of the gross sales price of all shares of common stock sold. Shares of common stock sold under the Sales Agreement are offered and sold pursuant to the Company's registration statement on Form S-3, which was filed with the SEC on April 16, 2021 and declared effective on April 29, 2021. During the year ended December 31, 2021, the Company sold 786,927 shares of common stock pursuant to the Sales Agreement at an average price of $12.04 per share for aggregate net proceeds of approximately $9.0 million. Other than the Sales Agreement, the Company currently does not have any commitments to obtain additional funds.

During the year ended December 31, 2021, the Company received $3.1 million from the exercise of warrants to acquire shares of the Company's common stock.

During the year ended December 31, 2021, the Company received $2.0 million from milestones achieved pursuant to the 3DMed Agreement (See Note 11). In January 2022, the Company announced that an IND application for a small Phase I clinical trial investigating safety of GPS in China was accepted by China's National Medical Products Administration ("NMPA"). 3D Medicines expects to initiate the trial by mid-2022 and will be responsible for all expenses related to executing the trial in China. On March 30, 2022, the IND was approved by the NMPA triggering a $1.0 million milestone payment to the Company which is expected to be received in the second quarter of 2022. The current clinical development plan provides for initiation of a Phase II clinical trial following receipt of satisfactory safety data from the Phase I study; the initiation of the Phase II study will also trigger a milestone payment to the Company which is expected in the second half of 2022. Total remaining potential milestone payments to the Company under the 3DMed Agreement total $192.5 million, not including future royalties.

The Company will require substantial additional financing to commercially develop any current or future product candidates. Alternatively, the Company will be required to scale back its plans and place certain activities on hold. Other than the Sales Agreement, the Company currently does not have any commitments to obtain additional funds, and may be unable to obtain sufficient funding in the future on acceptable terms, if at all. The Company's management continues to evaluate different strategies to obtain the required funding for future operations. These strategies may include utilizing the Sales Agreement, public and private placements of equity and/or debt securities, payments from potential strategic research and development collaborations, and licensing and/or marketing arrangements with pharmaceutical companies. Additionally, the Company continue to pursue discussions with global and regional pharmaceutical companies for licensing and/or co-development rights to its product candidates. There can be no assurance that these future funding efforts will be successful. If the Company cannot obtain the necessary funding, the Company will need to delay, scale back or eliminate some or all of its research and development programs; consider other various strategic alternatives, including a merger or sale; or cease operations.

3. Basis of Presentation and Significant Accounting Policies

Basis of Presentation

The accompanying consolidated financial statements have been prepared in conformity with accounting principles generally accepted in the United States (“U.S. GAAP”). Any reference in these notes to applicable guidance is meant to refer to U.S. GAAP as found in the Accounting Standards Codification ("ASC") and Accounting Standards Updates (“ASU”) of the Financial Accounting Standards Board (“FASB”).

Principles of Consolidation

The consolidated financial statements include the financial statements of the Company and its wholly owned subsidiaries. All significant intercompany accounts and transactions have been eliminated upon consolidation. Unless the context otherwise indicates, reference in these notes to the "Company" refer to SELLAS Life Sciences Group, Inc., and its wholly owned subsidiaries, Private SELLAS, SLSG Limited, LLC, Sellas Life Sciences Limited, and Apthera, Inc. The functional currency of the Company's non-U.S. operations is the U.S. dollar.

Use of Estimates

The preparation of these consolidated financial statements in accordance with U.S. GAAP requires management to make estimates and assumptions that affect the reported amounts of assets and liabilities and disclosure of contingent assets and liabilities at the date of the financial statements and the reported amounts of expenses during the reporting period.

On an ongoing basis, the Company evaluates its estimates using historical experience and other factors, including the current economic environment. Significant items subject to such estimates are assumptions used for purposes of determining stock-based compensation, carrying value of IPR&D and any related impairment, carrying value of goodwill, fair value of contingent purchase price consideration, accounting for deferred income taxes, and accounting for research and development activities. Management believes its estimates to be reasonable under the circumstances. Actual results could differ significantly from those estimates.

Reclassifications

Certain prior year amounts have been reclassified to conform to current year presentation. These reclassifications had no effect on the Company's loss from operations, net loss, and net loss per share.

Segment Information

Operating segments are defined as components of an enterprise about which separate discrete information is available for evaluation by the chief operating decision maker, or decision-making group, in deciding how to allocate resources and in assessing performance. The Company views its operations and manages its business in one segment.

Fair Value of Financial Instruments

The Company measures certain financial assets and liabilities at fair value on a recurring basis. Fair value is an exit price, representing the amount that would be received to sell an asset or paid to transfer a liability in an orderly transaction between market participants. As such, fair value is a market-based measurement that should be determined based on assumptions that market participants would use in pricing an asset or a liability. A three-tier fair value hierarchy is established as a basis for considering such assumptions and for inputs used in the valuation methodologies in measuring fair value:

Level 1—Quoted prices in active markets for identical assets or liabilities.

Level 2—Inputs other than quoted prices included within Level 1 that are observable, either directly or indirectly, such as quoted prices for similar assets or liabilities; quoted prices in markets that are not active; or other inputs that are observable or can be corroborated by observable market data for substantially the full term of the assets or liabilities.

Level 3—Unobservable inputs that are supported by little or no market activity and that are significant to the fair value of the assets or liabilities.

As of December 31, 2021 and 2020, the carrying amounts of the Company’s financial instruments, including cash equivalents and accounts payable, approximate fair value due to the short-term nature of those instruments and were categorized as Level 1. As of December 31, 2021 and 2020, the carrying amounts of the Company’s contingent consideration and liability-classified warrants are each recorded at their estimated fair value. The fair value of the contingent consideration and warrants utilize certain unobservable inputs that fall within Level 3 of the fair value hierarchy. See Note 6 for additional information on the fair value of certain financial assets and liabilities.

Concentration of Credit Risk

Financial instruments that potentially expose the Company to concentrations of credit risk consist principally of cash on deposit with multiple financial institutions, the balances of which frequently exceed federally insured limits.

Impact of COVID-19

The ongoing global COVID-19 pandemic, including the surges of cases from the Delta and Omicron variants, continues to disrupt the Company's business operations and those of its contractors, contract research organizations ("CROs"), suppliers, clinical sites, contract manufacturing organizations ("CMOs"), and other partners. The COVID-19 pandemic could affect the health and availability of the Company's workforce and that of the third-parties it relies on, such as its CROs, clinical sites, CMOs, and other contractors as well as the governmental agencies, such as the U.S. Food and Drug Administration ("FDA") and health authorities in other countries which could delay or otherwise adversely impact the ability of such parties to fulfill their obligations. The Company is continuously monitoring the impact of the pandemic on its clinical development programs. The full extent to which the COVID-19 pandemic will continue to directly or indirectly impact the Company's business, results of operations and financial condition will depend on future developments that are highly uncertain, subject to change and cannot be predicted with confidence, including the duration of the outbreak, the continued availability and efficacy of vaccines, new information which may emerge concerning the severity of COVID-19, the emergence of new variants of COVID-19, and the actions to contain COVID-19 or treat its impact, among others.

Cash and Cash Equivalents

The Company considers any highly liquid investments, such as money market funds, with an original maturity of three months or less to be cash and cash equivalents.

Restricted Cash and Cash Equivalents

Restricted cash consists of certificates of deposit on hand with the Company's financial institutions as collateral for its corporate credit cards.

The following table provides a reconciliation of the components of cash, cash equivalents, restricted cash, and restricted cash equivalents reported in the Company's consolidated balance sheets to the total amount presented in the consolidated statements of cash flows (in thousands):

	December 31,	
	2021	2020
Cash and cash equivalents	$ 21,355	$ 35,302
Restricted cash and cash equivalents	100	100
Total cash, cash equivalents, restricted cash, and restricted cash equivalents	$ 21,455	$ 35,402

The Company maintained $0.1 million as of December 31, 2021 and 2020, on hand with the Company's financial institutions as collateral for its corporate credit cards.

Intangible Assets

As part of the business combination with Galena, the Company acquired certain in-process research and development ("IPR&D") assets, which were capitalized as intangible assets. Costs to develop these assets are recorded in research and development expense as incurred in the Company's consolidated statements of operations.

The Company's intangible assets were comprised of identifiable assets which are considered indefinite-lived intangible assets and are assessed for impairment annually in the fourth quarter of each fiscal year or more frequently if impairment indicators exist. In the fourth quarter of 2021 as part of its annual impairment analysis, the Company measured the fair value of the IPR&D asset, nelipepimut-S ("NPS"), by estimating the costs to develop the acquired technology into commercially viable products, estimating the resulting revenue from the projects and discounting the related net cash flow to present value. The revenue and cost projections used to value IPR&D were reduced based on the probability of success of developing NPS in other oncology indications outside of breast cancer, given that the Company determined that consummating an out-licensing transaction of NPS for further development in breast cancer was unlikely. Additionally, the projections consider the relevant market sizes and growth factors, expected trends in technology and the nature and expected timing of new product introductions by the Company and its competitors. The rates utilized to discount the net cash flow to their present value are commensurate with the stage of development of the projects and uncertainties in the economic estimates used in the projections. In the fourth quarter of 2021, the fair value of the Company's NPS IPR&D was determined to exceed its carrying value by $5.7 million, and as such the Company recognized an impairment charge equal to the same amount that was recorded within in-process research and development impairment charge in the Company's consolidated statements of operations.

Goodwill

Goodwill is the excess of the cost of an acquired entity over the net amounts assigned to tangible and intangible assets acquired and liabilities assumed. Goodwill is not amortized but is subject to an annual impairment test. The Company has a single reporting unit and all goodwill relates to that reporting unit. The Company performs its annual goodwill impairment test in the fourth quarter of each fiscal year or more frequently if changes in circumstances or the occurrence of events suggest that an impairment exists. The Company did not recognize any impairment of goodwill during the years ended December 31, 2021 and 2020.

Contingent Consideration

The consideration for Galena's acquisition of Apthera, Inc. in 2011 includes future payments that are contingent upon the achievement of certain events related to the development and commercialization of NPS. Contingent consideration, and the obligations for such contingent consideration payments, is required to be recognized at fair value as of the acquisition date. The contingent consideration obligations are then evaluated each reporting period and changes in the fair value of contingent consideration, other than changes due to payments, are recognized as a gain or loss and recorded within the change in the fair value of contingent consideration in the Company's consolidated statements of operations. The fair value of development and regulatory milestones are estimated utilizing a probability adjusted, discounted cash flow approach. The fair value of net sales milestones is based on probability adjusted sales estimates and estimated discount rates and utilizes an option pricing model with *Monte Carlo* simulation to simulate a range of possible payment scenarios, and the average of the payments in these scenarios is then discounted to calculate present fair value. During the fourth quarter of 2021, the Company changed the valuation technique of net sales milestones from a probability adjusted, discounted cash flow approach to the option pricing model with *Monte Carlo* simulation.

The discount rates used are an estimated measure of credit risk associated with the years of expected payments based on the current development stage of the associated product candidate, the Company's specific development plan for that product candidate adjusted for the probability of completing the stages of development and when the contingent payments would be triggered. In estimating the probability of success, the Company utilizes data regarding similar milestone events from several sources, including industry studies and the Company's experience. The fair value of the contingent consideration is classified as a Level 3 liability as the valuation requires substantial judgment and estimation of factors that are not currently observable in the market. If different assumptions were used for the various inputs to the valuation, including but not limited to, assumptions involving the probability of success, estimated discount rate, and projected years of payment, the estimated fair value could be significantly higher or lower than the fair value determined. See Note 6 for additional information on the contingent consideration.

Leases

The Company accounts for its leasing arrangements under ASU No. 2016-02, *Leases (Topic 842)* (“Topic 842”). Under Topic 842, all significant lease arrangements are generally recognized at lease commencement. Operating lease right-of-use ("ROU"), assets and lease liabilities are recognized at the commencement date. An ROU asset and corresponding lease liability is not recorded for leases with an initial term of 12 months or less (short term leases) and the Company recognizes lease expense for these leases as incurred over the lease term.

ROU assets represent the Company’s right to use an underlying asset during the reasonably certain lease terms and lease liabilities represent the Company’s obligation to make lease payments arising from the lease. The Company’s lease terms may include options to extend or terminate the lease when it is reasonably certain that the option will be exercised. Operating lease ROU assets and liabilities are recognized at commencement date based on the present value of lease payments over the lease term. The Company primarily uses its incremental borrowing rate, based on the information available at commencement date, in determining the present value of lease payments. The operating lease ROU asset also includes any lease payments related to initial direct cost and prepayments and excludes lease incentives. Lease expense is recognized on a straight-line basis over the lease term. The Company’s lease agreement contains lease and non-lease components, which are generally accounted for separately. See Note 8 for discussion of the Company’s facility lease.

Revenue Recognition

The Company records revenue in accordance with ASC Topic 606, *Revenue From Contracts with Customers* ("Topic 606"). This standard applies to all contracts with customers, except for contracts that are within the scope of other standards, such as leases, insurance, collaboration arrangements and financial instruments. Under Topic 606, an entity recognizes revenue when its customer obtains control of promised goods or services, in an amount that reflects the consideration that the entity expects to receive in exchange for those goods or services. To determine revenue recognition for arrangements that an entity determines are within the scope of Topic 606, the entity performs the following five-steps: (i) identify the contract(s) with a customer; (ii) identify the performance obligations in the contract; (iii) determine the transaction price; (iv) allocate the transaction price to the performance obligations in the contract; and (v) recognize revenue when (or as) the entity satisfies a performance obligation. The Company only applies the five step model to contracts when it is probable that the entity will collect the consideration it is entitled to in exchange for the goods or services it transfers to the customer. At contract inception, once the contract is determined to be within the scope of Topic 606, the Company assesses the goods or services promised within each contract and determines those that are performance obligations, and assesses whether each promised good or service is distinct. The Company then allocates the transaction price to each distinct performance obligation based on its relative standalone selling price. The Company recognizes as revenue the amount of the transaction price that is allocated to the respective performance obligation when (or as) the performance obligation is satisfied. See Note 11 for further discussion of the Company's revenue recognition associated with the License Agreement with 3D Medicines Inc.

Development, Regulatory and Sales Milestones and Other Payments

At the inception of each arrangement that includes regulatory or development milestone payments, the Company evaluates whether the milestones are considered probable of being achieved and estimates the amount to be included in the transaction price using the most likely amount method. If it is probable that a significant revenue reversal would not occur, the associated milestone value is included in the transaction price. Milestone payments that are not within the control of the Company or the licensee, such as regulatory approvals, are not considered probable of being achieved until those approvals are received. The Company evaluates factors such as the scientific, clinical, regulatory, commercial, and other risks that must be overcome to achieve the particular milestone in making this assessment. There is considerable judgment involved in determining whether it is probable that a significant revenue reversal would not occur. At the end of each subsequent reporting period, the Company reevaluates the probability of achievement of all milestones subject to constraint and, if necessary, adjusts its estimate of the overall transaction price. Any such adjustments are recorded on a cumulative catch-up basis, which would affect revenues and earnings in the period of adjustment.

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

Research and Development Expenses

Research and development costs are expensed as incurred. Research and development costs that are paid in advance of performance are capitalized as a prepaid expense and recognized as research and development expenses as the services are provided. Clinical study costs, a component of research and development expenses, are accrued over the service periods specified in the contracts and adjusted as necessary based on an ongoing review of the level of effort and costs actually incurred. Payments for a product license prior to regulatory approval of the product and payments for milestones achieved prior to regulatory approval of the product are expensed in the period incurred as research and development expenses. Milestone payments made in connection with regulatory approvals are capitalized and amortized to cost of revenue over the remaining useful life of the asset.

Research and development expenses primarily consist of the intellectual property and research and development materials acquired, expenses from third parties who conduct research and development activities on behalf of the Company as well as related wages, benefits and other operating costs. The Company expenses IPR&D projects acquired as asset acquisitions which have not reached technological feasibility and which have no alternative future use.

Stock-based Compensation

The Company measures employee and non-employee director share-based awards at their grant-date fair value and records compensation expense on a straight-line basis over the vesting period of the awards.

Estimating the fair value of share-based awards requires the input of subjective assumptions, including the expected life of the options and stock price volatility. The Company accounts for forfeitures for stock option awards as they occur. The Company uses the Black-Scholes option pricing model to value its stock option awards. The assumptions used in estimating the fair value of share-based awards represent management’s estimate and involve inherent uncertainties and the application of management’s judgment. As a result, if factors change and management uses different assumptions, share-based compensation expense could be materially different for future awards.

The expected life of the stock options is estimated using the “simplified method,” as the Company has limited historical information from which to develop reasonable expectations about future exercise patterns and post-vesting employment termination behavior for its stock option grants. The simplified method is the midpoint between the vesting period and the contractual term of the option. For stock price volatility, the Company uses comparable public companies as a basis for its expected volatility to calculate the fair value of option grants as it does not have adequate historical pricing information of its own stock commensurate with the expected term. The risk-free rate is based on the U.S. Treasury yield curve commensurate with the expected life of the option.

Restricted Stock Units with Performance and Service Conditions

The Company's Board of Directors has granted restricted stock units ("RSUs") to certain employees that vest based on performance and service conditions. The fair values of the performance-based RSUs are measured on the date of grant and are based on the Company's closing stock price on such date. Compensation expense is recognized for the number of performance-based RSUs expected to be earned, provided the requisite service period has been rendered, after assessing the probability that certain performance criteria will be met. Cumulative adjustments are recorded each quarter to reflect the estimated outcome of the performance-related conditions until the date results are determined and settled. The Company accounts for forfeitures of performance-based RSUs when they occur. If performance criteria are not met or are not expected to be met, any compensation expense previously recognized to date associated with the performance-based RSUs will be reversed.

Restricted Stock Units with Service Conditions Only

The Board of Directors has granted RSUs to certain employees that vest based on continuous service. Time-vested RSUs awarded to employees vest one-fourth per year annually over four years, provided the employee remains employed with the Company. The fair values of the time-vested RSUs are measured on the date of grant and are based on the Company's closing stock price on such date. Compensation expense for time-vested RSUs with service conditions only are recognized straight-line over the applicable service period. The Company accounts for forfeitures of time-vested RSUs when they occur. Previously recognized compensation expense for forfeited RSUs are reversed in the period the time-vested RSUs are forfeited.

Income Taxes

The Company uses the asset and liability method of accounting for income taxes. 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 bases and operating loss and credit carryforwards. Deferred tax assets and liabilities are measured using enacted tax rates expected to apply to taxable income in the years in which those temporary differences are expected to be recovered or settled. A valuation allowance is provided when it is more likely than not that some portion or all of a deferred tax asset will not be realized. The Company recognizes the benefit of an uncertain tax position that it has taken or expects to take on its income tax returns, if such a position is more likely than not to be sustained. Potential interest and penalties associated with unrecognized tax positions are recognized in income tax expense. No interest or penalties were recognized in either of the years ended December 31, 2021 or 2020.

The Company recognizes liabilities or assets for the deferred tax consequences of temporary differences between the tax basis of assets or liabilities and their reported amounts in the consolidated financial statements in accordance with FASB ASC 740-10, “*Accounting for Income Taxes” (“ASC 740-10”).* These temporary differences will result in taxable or deductible amounts in future years when the reported amounts of the assets or liabilities are recovered or settled. ASC 740-10 requires that a valuation allowance be established when management determines that it is more likely than not that all or a portion of a deferred asset will not be realized. The Company evaluates the realizability of its net deferred income tax assets and valuation allowances as necessary, at least on an annual basis. During this evaluation, the Company reviews its forecasts of income in conjunction with other positive and negative evidence surrounding the realizability of its deferred income tax assets to determine if a valuation allowance is required. Adjustments to the valuation allowance will increase or decrease the Company’s income tax provision or benefit. The recognition and measurement of benefits related to the Company’s tax positions requires significant judgment, as uncertainties often exist with respect to new laws, new interpretations of existing laws, and

rulings by taxing authorities. Differences between actual results and the Company's assumptions or changes in the Company's assumptions in future periods are recorded in the period they become known.

Net Loss Per Share

Basic loss per share is computed by dividing net loss applicable to common stockholders by the weighted average number of shares of common stock outstanding during each period. Diluted loss per share includes the effect, if any, from the potential exercise or conversion of securities, such as warrants, stock options and unvested restricted stock that would result in the issuance of incremental shares of common stock. In computing the basic and diluted net loss per share, the weighted average number of shares remains the same for both calculations due to the fact that when a net loss exists, dilutive shares are not included in the calculation as the impact is anti-dilutive.

The following potentially dilutive securities outstanding have been excluded from the computation of diluted weighted average shares outstanding, as their impact would be anti-dilutive (in thousands):

	December 31,	
	2021	2020
Common stock warrants	519	1,392
Stock options	534	208
Restricted stock units	200	170
	1,253	1,770

Recent Accounting Pronouncements Adopted

In December 2019, the FASB issued ASU No. 2019-12, *Income Taxes (Topic 740):Simplifying the Accounting for Income Taxes* which, among other things, eliminates certain exceptions in the current rules regarding the approach for intra-period tax allocations and the methodology for calculating income taxes in an interim period, and clarifies the accounting for transactions that result in a step-up in the tax basis of goodwill. The standard was adopted by the Company on January 1, 2021. This new standard did not have a material impact on the Company's financial statements.

Recent Accounting Standards Not Yet Adopted

In August 2020, the FASB issued ASU No. 2020-06, *Debt—Debt with Conversion and Other Options (Subtopic 470-20) and Derivatives and Hedging—Contracts in Entity's Own Equity (Subtopic 815-40): Accounting for Convertible Instruments and Contracts in an Entity's Own Equity* which, among other things, simplifies the accounting models for the allocation of proceeds attributable to the issuance of a convertible debt instrument. As a result, after adopting the ASU's guidance, entities will not separately present in equity an embedded conversion feature in such debt. Instead, they will account for a convertible debt instrument wholly as debt, and for convertible preferred stock wholly as preferred stock (i.e., as a single unit of account), unless (i) a convertible instrument contains features that require bifurcation as a derivative under ASC 815 or (ii) a convertible debt instrument was issued at a substantial premium. The standard becomes effective for the Company in the first quarter of 2024 and early adoption is permitted. The Company is currently evaluating the potential impact of the adoption of this standard on its consolidated financial statements.

In May 2021, ASU No. 2021-04, *Issuer's Accounting for Certain Modifications of Exchanges of Freestanding Equity-Classified Written Call Options* was issued to clarify the accounting for modifications or exchanges of freestanding equity-classified written call options, such as warrants, that remain equity classified after modification or exchange. This ASU became effective for the Company on January 1, 2022 and is not expected to have a material impact on the consolidated financial statements.

4. Goodwill and Intangible Assets

A reconciliation of the change in goodwill and intangible assets for the year ended December 31, 2021 is as follows (in thousands):

	In-Process Research and Development	Goodwill
December 31, 2020	$ 5,700	$ 1,914
Impairment charge	(5,700)	—
December 31, 2021	$ —	$ 1,914

In the fourth quarter of 2021, the Company recognized an impairment charge in connection with our determination that consummating an out-licensing transaction of NPS for further development in breast cancer was unlikely and taking into account the deferred development timelines and a lower probability of success associated with earlier stages of clinical development for the potential development of NPS in other oncology indications. The Company determined that the carrying amount of the IPR&D associated with NPS exceeded the fair value and recorded a $5.7 million impairment charge during the year ended December 31, 2021 and reduced the fair value of the related IPR&D intangible asset to zero. See Note 2 for discussion on how the Company determined the fair value of its IPR&D. There was no impairment charge during the year ended December 31, 2020.

As of December 31, 2021 and 2020, there were no accumulated impairment losses related to goodwill.

5. Collaboration and In-License Agreements

As part of its business, the Company enters into in-licensing agreements with third parties that often require milestone and royalty payments based on the progress of the licensed asset through development and commercial stages. Milestone payments may be required, for example, upon approval of the product for marketing by a regulatory agency, and the Company may be required to make royalty payments based upon a percentage of net sales of the product. The expenditures required under these arrangements in any period may be material and are likely to fluctuate from period to period. These arrangements sometimes permit the Company to unilaterally terminate development of the product and thereby avoid future contingent payments; however, the Company is unlikely to cease development if the compound successfully achieves clinical testing objectives.

Exclusive License Agreement with Memorial Sloan Kettering Cancer Center

On September 4, 2014, the Company entered into a license agreement (the “Original MSK License Agreement”) with MSK under which the Company was granted an exclusive license to develop and commercialize MSK’s WT1 peptide vaccine technology. The Original MSK License Agreement, unless terminated earlier in accordance with the terms of the Original MSK License Agreement, will continue on a country-by-country and licensed product-by-licensed product basis, until the later of: (i) expiration of the last valid claim embracing such licensed product; (ii) expiration of any market exclusivity period granted by law with respect to such licensed product; or (iii) ten (10) years from the first commercial sale in such country.

On May 25, 2017, the Company and MSK entered into an Amended and Restated Exclusive License Agreement (the “MSK A&R License Agreement”). Under the MSK A&R License Agreement, the Company expanded its license under the original MSK License Agreement, as amended, to include a license to commercially develop certain additional WT1 peptides through a program of exploiting certain patents and other rights covering such peptides. The MSK A&R License Agreement, among other changes, added certain milestone payments for each additional patent licensed product as defined in the MSK A&R License Agreement.

On October 11, 2017, the Company and MSK entered into a second Amended and Restated Exclusive License Agreement (the “Second MSK A&R License Agreement”). Under the Second MSK A&R License

Agreement, the Company and MSK extended certain milestone dates for the Company in exchange for increased milestone payments.

The Company incurred $0.1 million of guaranteed minimum royalty payments under the Second MSK A&R License Agreement during the years ended December 31, 2021 and 2020. Such expenses have been included in research and development costs.

The Company incurred $0.2 million of sublicensing fees payable under our license from MSK in connection with the 3DMed Agreement during year ended December 31, 2021 included in cost of revenue. There was no cost of license revenue during the year ended December 31, 2020.

Merck & Co., Inc. Clinical Trial Collaboration and Supply Agreement

On September 21, 2017, the Company entered into a clinical trial collaboration and supply agreement (the "Merck Agreement") through a Merck & Co., Inc. subsidiary, Merck Sharp & Dohme B.V. (“Merck subsidiary”), whereby the Company agreed with the Merck subsidiary to collaborate in a research program to evaluate GPS as it is administered in combination with Merck’s PD1 blocker pembrolizumab in a Phase 1/2 clinical trial enrolling patients in up to five cancer indications, including both hematologic malignancies and solid tumors assessing the efficacy and safety of the combination, comparing overall response rates and immune response markers achieved with the combination compared to prespecified rates based on those seen with pembrolizumab alone in comparable patient populations.

In the fourth quarter of 2018, pursuant to the Merck Agreement, the Company initiated a Phase 1/2 multi-arm ("basket" type) clinical study of GPS in combination with Merck & Co., Inc.’s anti-PD-1 therapy, Keytruda® (pembrolizumab) in patients with WT1+ relapsed or refractory tumors. In July 2019, the Company dosed the first patient in this trial. In 2020, the Company, together with Merck determined to focus on ovarian cancer (second or third line). In February 2022, the Company reported that enrollment in the study was completed. Data from the majority of evaluable patients is expected to be examined by mid-2022, with final data analysis for all evaluable patients expected by the end of 2022.

The University of Texas M. D. Anderson Cancer Center and The Henry M. Jackson Foundation for the Advancement of Military Medicine, Inc.

On September 11, 2006, the Company acquired rights and assumed obligations under a license agreement among Apthera and The University of Texas M. D. Anderson Cancer Center (“MDACC”) and The Henry M. Jackson Foundation for the Advancement of Military Medicine, Inc. (“HJF”) which grants exclusive worldwide rights to a U.S. patent covering NPS and several U.S. and foreign patents and patent applications covering methods of using the peptide as a vaccine. Under the terms of this license, the Company is required to pay an annual maintenance fee of $0.2 million, up to $3.8 million for clinical milestone payments, and to pay a tiered royalty in the mid-single digits based on sales of NPS or other therapeutic products developed from the licensed technologies. The Company incurred the annual maintenance fee during the years ended December 31, 2021 and 2020 and the expenses have been included in research and development costs.

6. Fair Value Measurements

The following tables present information about the Company's assets and liabilities measured at fair value on a recurring basis in the consolidated balance sheets (in thousands):

Description	December 31, 2021	Quoted Prices In Active Markets (Level 1)	Significant Other Observable Inputs (Level 2)	Unobservable Inputs (Level 3)
Assets:				
Cash equivalents	$ 21,000	$ 21,000	$ —	$ —
Restricted cash equivalents	100	100	—	—
Total assets measured and recorded at fair value	$ 21,100	$ 21,100	$ —	$ —
Liabilities:				
Warrants potentially settleable in cash	$ 40	$ —	$ —	$ 40
Contingent consideration	296	—	—	296
Total liabilities measured and recorded at fair value	$ 336	$ —	$ —	$ 336

Description	December 31, 2020	Quoted Prices In Active Markets (Level 1)	Significant Other Observable Inputs (Level 2)	Unobservable Inputs (Level 3)
Assets:				
Cash equivalents	$ 34,959	$ 34,959	$ —	$ —
Restricted cash equivalents	$ 100	$ 100		
Total assets measured and recorded at fair value	$ 35,059	$ 35,059	$ —	$ —
Liabilities:				
Warrants potentially settleable in cash	$ 55	$ —	$ —	$ 55
Contingent consideration	4,633	—	—	4,633
Total liabilities measured and recorded at fair value	$ 4,688	$ —	$ —	$ 4,688

The Company did not transfer any financial instruments into or out of Level 3 classification during the years ended December 31, 2021 and 2020. See Note 10 for a reconciliation of the changes in the fair value of the warrant liability for the years ended December 31, 2021.

The Company presents the contingent consideration liability at fair value and it is measured at the end of each reporting period using Level 3 inputs. The contingent consideration relates to Galena's acquisition of Apthera, Inc. in 2011 and the future contingent payments based on the achievement of certain development, regulatory and net sales milestones relating to NPS. The contingent consideration is payable at the election of the Company in either cash or shares of common stock, provided that the Company may not issue any shares in satisfaction of any contingent consideration unless it has first obtained approval of its stockholders in accordance with Rule 5635(a) of the Nasdaq Marketplace Rules.

A reconciliation of the change in the fair value of the contingent consideration liability for the year ended December 31, 2021 and 2020 is as follows (in thousands):

	Fair Value Measurements Using Significant Unobservable Inputs (Level 3)
Contingent consideration, December 31, 2019	$ 4,912
Change in the estimated fair value of the contingent consideration	(279)
Contingent consideration, December 31, 2020	4,633
Change in the estimated fair value of the contingent consideration	(4,337)
Contingent consideration, December 31, 2021	$ 296

During the year ended December 31, 2021, the significant unobservable inputs were adjusted in connection with our determination that consummating an out-licensing transaction of NPS for further development in breast cancer was unlikely and taking into account the deferred development timeline and a lower probability of success associated with earlier stages of clinical development for the potential development of NPS in other oncology indications. See Note 2 for further discussion on how the Company determines the fair value of its contingent consideration.

The following significant unobservable inputs were used in the valuation of the contingent consideration liability:

Unobservable input	As of December 31, 2021	As of December 31, 2020
Potential milestone payments	$0 - $30 million	$0 - $30 million
Discount rate	15.5 %	6.6 %
Cumulative probability of success	5.3 %	33.0 %
Projected years of payments	2028 - 2031	2026 - 2029

7. Balance Sheet Accounts

Prepaid expenses and other current assets consist of the following (in thousands):

	December 31,	
	2021	2020
Clinical trial costs	$ 1,309	$ 95
Insurance	217	221
Professional fees	36	49
Other	27	30
Prepaid expenses and other current assets	$ 1,589	$ 395

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

	December 31,	
	2021	2020
Clinical trial costs	$ 1,325	$ 631
Compensation and related benefits	989	812
Professional fees	165	276
Other	161	194
Accrued expenses and other current liabilities	$ 2,640	$ 1,913

8. Legal Proceedings, Commitments and Contingencies

Legal Proceedings

From time to time, the Company is subject to various pending or threatened legal actions and proceedings, including those that arise in the ordinary course of its business, which may include employment matters, breach of contract disputes and stockholder litigation. Such actions and proceedings are subject to many uncertainties and to outcomes that are not predictable with assurance and that may not be known for extended periods of time. The Company records a liability in its consolidated financial statements for costs related to claims, including future legal costs, settlements and judgments, when the Company has assessed that a loss is probable and an amount can be reasonably estimated. If the reasonable estimate of a probable loss is a range, the Company records the most probable estimate of the loss or the minimum amount when no amount within the range is a better estimate than any other amount. The Company discloses a contingent liability even if the liability is not probable or the amount is not estimable, or both, if there is a reasonable possibility that a material loss may have been incurred. In the opinion of management, as of the date hereof, the amount of liability, if any, with respect to these matters, individually or in the aggregate, will not materially affect the Company's consolidated results of operations, financial position or cash flows.

The Company's predecessor, Galena, was involved in multiple legal proceedings and administrative actions, including stockholder class actions, both state and federal. In 2021, the Company settled all remaining legacy Galena litigation as follows:

- Certain putative shareholder securities class action complaints originally filed against Galena in 2017 which alleged, among other things, that Galena and certain of Galena's former officers and directors failed to disclose that certain of Galena's promotional practices were allegedly improper and that these alleged failures rendered Galena's statements about its business misleading. The actions were consolidated with lead plaintiffs named by the U.S. District Court for the District of New Jersey. In 2021, the Company reached a settlement with the plaintiffs in this action which, in November 2021, received preliminary court approval and which was fully covered by our directors and officers insurance policy applicable to this case. Final approval from the court was received on February 24, 2022.

- In March 2017, a derivative complaint was filed in the U.S. District Court for the District of New Jersey against Galena's former directors and Galena, as a nominal defendant. In July 2017, a derivative complaint was filed in California state court against Galena's former directors and Galena, as a nominal defendant. In January 2018, a derivative complaint was filed in the U.S. District Court for the District of New Jersey against Galena's former directors, officers and employees, and the Company as a nominal defendant. These complaints purported to assert derivative claims for breach of fiduciary duty on the Company's behalf against its former directors and, in certain of the complaints, certain of the Company's former officers and former employees, based on substantially similar facts as alleged in the putative shareholder securities class action complaint. The Company reached a settlement with the plaintiffs in these three cases which was approved by the U.S. District Court for the District of New Jersey on November 19, 2021, and which was fully covered by the Company's directors and officers insurance policy applicable to these cases.

Contingent Consideration related to Development, Regulatory and Commercial Milestone Payments and Business Combinations

The Company acquires assets still in development and enters into research and development arrangements with third parties that often require milestone and royalty payments based on the progress of the asset through development stages. Milestone payments may be required, for example, upon approval of the product for marketing by a regulatory agency. In certain agreements, the Company is required to make royalty payments based upon a percentage of the sales.

These arrangements may be material individually, and in the unlikely event that milestones for multiple products covered by these arrangements were reached in the same period, the aggregate charge to expense could be material to the results of operations. In addition, these arrangements often give the Company the discretion to unilaterally terminate development of the product, which would allow the Company to avoid making the contingent payments; however, the Company is unlikely to cease development if the compound successfully achieves clinical testing objectives. See Note 5 for additional information on the Company's commitments under collaboration and license agreements and commitments of contingent consideration.

Leases

The Company has a non-cancelable operating lease for office space in New York, New York, which began June 5, 2020 with a term through December 31, 2024. At inception of the lease, the Company recognized a current operating lease liability of $0.1 million and a non-current operating lease liability of $0.9 million with a corresponding ROU asset of $1.0 million, which is based on the present value of the minimum rental payments of the lease. The discount rate used to account for the Company's operating lease under ASC Topic 842 is the Company's estimated incremental borrowing rate of 13%. As of December 31, 2021, the lease has a remaining term of 3.0 years.

Rent expense related to the Company's operating lease was approximately $0.3 million and $0.4 million for the years ended December 31, 2021 and 2020, respectively. The Company made cash payments related to operating leases of approximately $0.3 million during each of the years ended December 31, 2021 and 2020.

Future minimum rental payments under the Company's non-cancelable operating lease are as follows as of December 31, 2021 (in thousands):

Total minimum lease payments:		
2022	$	311
2023		321
2024		330
Total future minimum lease payments		962
Less: imputed interest		(154)
Operating lease liability	$	808

On December 6, 2021, the Company entered into a sublease amendment to expand its office space in New York, New York. In accordance with the agreement, the commencement of the sublease will not begin until the sublandlord has vacated and made the space available and ready for use, which did not occur until February 21, 2022. Therefore, no amounts associated with the sublease amendment were recognized in the consolidated financial statements for the year ended December 31, 2021. On February 22, 2022, a commencement date was reached as the Company took over the space and will begin making additional rental payments of approximately $0.2 million per year through December 31, 2024.

9. Stockholders' Equity

Preferred Stock

The Company has authorized up to 5,000,000 shares of preferred stock, $0.0001 par value per share, for issuance. There were no preferred shares outstanding as of December 31, 2021 and 2020.

Common Stock

The Company has authorized up to 350,000,000 shares of common stock, $0.0001 par value per share, for issuance.

On April 16, 2021, the Company entered into the Sales Agreement with Cantor Fitzgerald & Co. (the "Agent"). From time to time during the term of the Sales Agreement, the Company may offer and sell shares of common stock having an aggregate offering price up to a total of $50.0 million in gross proceeds. The Agent will collect a fee equal to 3% of the gross sales price of all shares of common stock sold. During the year ended December 31, 2021, the Company sold 786,927 shares of common stock pursuant to the Sales Agreement at an average price of $12.04 per share for aggregate net proceeds of approximately $9.0 million.

On December 13, 2020, the Company entered into a Securities Purchase Agreement with certain investors, pursuant to which the Company agreed to issue and sell, in a registered direct offering by the Company directly to the investors (the “December 2020 Registered Direct Offering”), an aggregate of 2,320,000 shares of common stock, par value $0.0001 per share, of the Company, at an offering price of $7.00 per share for gross proceeds of approximately $16.2 million. The net proceeds to the Company from the December 2020 Registered Direct Offering, after deducting placement agent fees and related offering expenses, was approximately $15.0 million.

On July 31, 2020, the Company entered into a Securities Purchase Agreement with certain investors, pursuant to which the Company agreed to issue and sell, in a private placement directly to the investors (the "July 2020 PIPE Offering"), 2,744,078 shares of its common stock and accompanying warrants to purchase up to an aggregate of 2,744,078 shares of common stock at a combined purchase price of $3.335 per share and accompanying warrant. The warrants were immediately exercisable upon issuance at an exercise price of $3.30 per share and will expire five years from the date of issuance. The July 2020 PIPE Offering closed on August 4, 2020. The net proceeds to the Company from the July 2020 PIPE Offering, after deducting placement agent fees and related offering expenses, were approximately $8.5 million.

On January 9, 2020, the Company entered into a Securities Purchase Agreement with certain investors, pursuant to which the Company agreed to issue and sell, in a registered direct offering by the Company directly to the investors (the “January 2020 Registered Direct Offering”), (i) an aggregate of 1,189,000 shares of common stock, par value $0.0001 per share, of the Company, at an offering price of $3.9825 per share and (ii) an aggregate of 448,800 pre-funded warrants exercisable for shares of common stock at an offering price of $3.9725 per pre-funded warrant, for gross proceeds of approximately $6.5 million before deducting the placement agent fee and related offering expenses. In a concurrent private placement, the Company issued to the Investors who participated in the January 2020 Registered Offering warrants exercisable for up to an aggregate of 818,900 shares of common stock at an exercise price of $3.93 per share. Each warrant was immediately exercisable upon issuance and will expire five and one-half years from the issuance date. The net proceeds to the Company from the January 2020 Registered Direct Offering, after deducting placement agent fees and related offering expenses, and excluding the exercise of any warrants, was approximately $6.0 million.

Shares of common stock reserved for future issuance are as follows (in thousands):

	December 31, 2021
Warrants outstanding	519
Stock options outstanding	534
Restricted stock units outstanding	200
Options reserved for future issuance under the Company’s 2019 Equity Incentive Plan	449
Shares reserved for future issuance under the Employee Stock Purchase Plans	311
Total shares of common stock reserved for future issuance	2,013

10. Warrants to Acquire Shares of Common Stock

The following is a summary of the Company's warrants to acquire shares of common stock activity for the year ended December 31, 2021 (in thousands, except per share data):

Warrant Issuance	Outstanding, December 31, 2020	Exercised	Outstanding, December 31, 2021	Exercise Price Per Share	Expiration
Warrants classified as equity:					
January 2020 Offering	719	(410)	309	$ 3.93	July 2025
July 2020 PIPE Offering	445	(420)	25	$ 3.30	August 2025
July 2018 Offering	141	(9)	132	$ 7.50	July 2023
March 2019 Exercise Agreement	63	(33)	30	$ 7.50	March 2024
Other	10	(1)	9	$ 306.66	December 2022 - June 2024
	1,378	(873)	505		
Warrants classified as liability:	14	—	14	$ 729.94	January 2022 - November 2023
	1,392	(873)	519		

Warrants to acquire shares of common stock primarily consist of equity-classified warrants. In addition, warrants to acquire shares of common stock that may require the Company to settle in cash are liability-classified warrants.

Warrants Classified as Equity

Equity-classified warrants consist of warrants to acquire common stock issued in connection with previous equity financings. During its evaluation of equity classification for warrants to acquire shares of common stock, the Company considered the conditions as prescribed within ASC 815-40, *Derivatives and Hedging, Contracts in an Entity's own Equity* ("ASC 815-40"). The conditions within ASC 815-40 are not subject to a probability assessment. The warrants to acquire shares of common stock do not fall under the liability criteria within ASC 480, *Distinguishing Liabilities from Equity*, as they are not puttable and do not represent an instrument that has a redeemable underlying security. The warrants to acquire shares of common stock do meet the definition of a derivative instrument under ASC 815, but are eligible for the scope exception as they are indexed to the Company's own stock and would be classified in permanent equity if freestanding.

Warrants Classified as Liabilities

Liability-classified warrants consist of warrants to acquire common stock issued in connection with previous equity financings. These warrants may be settled in cash and were determined to not be indexed to the Company's common stock. The liability-classified warrants are grouped within other warrants outstanding in the table above. The estimated fair value of outstanding warrants accounted for as liabilities is determined at each balance sheet date. Any decrease or increase in the estimated fair value of the warrant liability since the most recent balance sheet date is recorded in the consolidated statement of operations as a change in fair value of warrant liability. The fair value of the warrants accounted for as liabilities is estimated using a Black-Scholes pricing model with the following inputs:

	As of December 31,	
	2021	2020
Risk free interest rate	0.65 %	0.16 %
Volatility	131.04%	150.38%
Expected term (years)	1.75	2.75
Expected dividend yield	— %	— %
Strike price	$ 7.50	$ 7.50

The changes in fair value of the warrant liability for the year ended December 31, 2021 and 2020 were as follows (in thousands):

	Warrant Liability
Warrant liability, December 31, 2019	$ 52
Fair value of warrants exercised	(94)
Change in fair value of warrants	97
Warrant liability, December 31, 2020	55
Change in fair value of warrants	(15)
Warrant liability, December 31, 2021	$ 40

Deemed Dividend Arising from Warrant Modifications

On January 2, 2020, the Company amended the March 2019 Exercise Agreement warrants to provide for an exercise price of $7.50 per share (subject to adjustment for stock splits and the like). The reduced exercise price of the 63,000 New Warrants increased the fair value of these warrants by approximately $0.1 million during the year ended December 31, 2020, which was recorded as a deemed dividend increasing the net loss attributable to common stockholders and additional paid-in-capital.The expected volatility assumptions are based on the Company's implied volatility. The expected life assumption is based on the remaining contractual terms of the warrants. The risk-free rate is based on the zero coupon rates in effect at the time of valuation. The dividend yield used in the pricing model is zero, because the Company has no present intention to pay cash dividends on its shares of common stock.

11. License Revenue with 3D Medicines, Inc.

Exclusive License Agreement with 3D Medicines, Inc.

In December 2020, the Company, together with its wholly-owned subsidiary, SLSG Limited, LLC, entered into an Exclusive License Agreement (the “3DMed License Agreement”) with 3D Medicines Inc. ("3DMed"), pursuant to which the Company granted 3DMed a sublicensable, royalty-bearing license, under certain intellectual property owned or controlled by the Company, to develop, manufacture and have manufactured, and commercialize GPS and heptavalent GPS ("GPS Plus") product candidates ("GPS Licensed Products") for all therapeutic and other diagnostic uses in mainland China, Hong Kong, Macau and Taiwan ("3DMed Territory"). The license is exclusive, except with respect to certain know-how that has been non-exclusively licensed to the Company and is sublicensed to 3DMed on a non-exclusive basis. The Company has retained development, manufacturing and commercialization rights with respect to the GPS Licensed Products in the rest of the world.

In partial consideration for the rights granted by the Company, 3DMed agreed to pay the Company (i) a one-time upfront cash payment of $7.5 million, and (ii) milestone payments totaling up to $194.5 million in the aggregate upon the achievement of certain technology transfer, development and regulatory milestones, as well as sales milestones based on certain net sales thresholds of GPS Licensed Products in the 3DMed Territory in a given calendar year. The Company is responsible for providing the licensed technology and data (the "3DMed License") as well as transferring certain technological and manufacturing know-how (the "transfer of know-how").

3DMed also agreed to pay tiered royalties based upon a percentage of annual net sales of GPS Licensed Products in the 3DMed Territory ranging from the high single digits to the low double digits. The royalties are payable on a GPS Licensed Product-by-GPS Licensed Product and region-by-region basis commencing on the first commercial sale of a GPS Licensed Product in a region and continuing until the latest of (i) the date that is 15 years from the receipt of marketing authorization for such GPS Licensed Product in such region and (ii) the date that is 10 years from the expiration of the last valid claim of a licensed patent covering or claiming such GPS Licensed Product in such region. The royalty rate is subject to reduction under certain circumstances, including when generic competition for a GPS Licensed Product exists in a particular region.

3DMed is responsible for all costs related to developing, obtaining regulatory approval of and commercializing the GPS Licensed Products in the 3DMed Territory. 3DMed is required to use commercially reasonable best efforts to develop and obtain regulatory approval for, and upon receipt of regulatory approval, commercialize the GPS Licensed Products in the 3DMed Territory. A joint development committee has been established between 3DMed and the Company to coordinate and review the development, manufacturing and commercialization plans with respect to the GPS Licensed Products in the 3DMed Territory. The Company and 3DMed also agreed to negotiate in good faith the terms and conditions of a clinical supply agreement, a commercial supply agreement, and related quality agreements pursuant to which the Company will manufacture or have manufactured and supply 3DMed with all quantities of the GPS Licensed Products necessary for 3DMed to develop and commercialize the GPS Licensed Products in the 3DMed Territory until 3DMed has received all approvals required for 3DMed or its designated contract manufacturing organization to manufacture the GPS Licensed Products in the 3DMed Territory.

The 3DMed License Agreement will expire on a GPS Licensed Product-by-GPS Licensed Product and region-by-region basis on the date of the expiration of all of 3DMed's payment obligations to the Company. Upon expiration of the 3DMed License Agreement, the license granted to 3DMed will become fully paid-up, perpetual and irrevocable. Either party may terminate the 3DMed License Agreement for the other party's material breach following a cure period or upon certain insolvency events. The Company may terminate the 3DMed License Agreement if 3DMed or its affiliates or sublicensees challenge the validity or enforceability of the licensed patents. At any time following the two-year anniversary of the effective date, 3DMed has the right to terminate the 3DMed License Agreement for convenience, subject to certain requirements. 3DMed may terminate the 3DMed License Agreement upon prior notice to the Company if the grant of the license to 3DMed is prohibited or delayed for a period of time due to a change of U.S. export laws and regulations.

The 3DMed License Agreement includes customary representations and warranties, covenants and indemnification obligations for a transaction of this nature.

Revenue Recognition

The Company evaluated the 3DMed License Agreement and concluded that 3DMed was a customer and the contract should be evaluated under ASC 606. In determining the appropriate amount of revenue to be recognized under ASC 606 as the Company fulfills its obligations under the Agreement, the Company performs the following steps: (i) identifies the promised goods or services in the contract; (ii) determines whether the promised goods or services are performance obligations including whether they are distinct in the context of the contract; (iii) measures the transaction price, including any constraints on variable consideration; (iv) allocates the transaction price to the performance obligations; and (v) recognizes revenue when (or as) the Company satisfies each performance obligation.

The Company identified the 3DMed License and the transfer of know-how to be the material promises under the 3DMed License Agreement. The Company determined that 3DMed License and the transfer of know-how are not distinct from each other. As such, for the purposes of ASC 606, the Company determined that these two material promises, described above, should be combined into a single performance obligation.

The Company determined the initial transaction price of the single performance obligation to be $9.5 million, which includes the $7.5 million upfront fee as well as $2.0 million in development milestones that were assessed to be probable of being achieved at the inception of the 3DMed License Agreement and therefore were not

constrained. The Company achieved $2.0 million of these milestones during the year ended December 31, 2021. The Company determined that $192.5 million in future certain development, regulatory, and sales milestones is variable consideration subject to constraint at inception. At the end of each subsequent reporting period, the Company will reevaluate the probability of achievement of the future development, regulatory, and sales milestones subject to constraint and, if necessary, will adjust its estimate of the overall transaction price. Any such adjustments will be recorded on a cumulative catch-up basis, which would affect revenues and earnings in the period of adjustment.

For the sales-based royalties, the Company will recognize revenue when the related sales occur. To date, the Company has not recognized any royalty revenue resulting from any of its licensing arrangements.

Since 3DMed is benefiting from the combined single performance obligation relating to the 3DMed License and the transfer of know-how as the technology transfer occurs, the Company recognized the transaction price over the technology transfer period, which was finalized in the second quarter of 2021. The revenue recognized is based an output method to measure progress, using a straight-line convention, which the Company believes reasonably approximates its efforts in satisfying the combined performance obligation. The Company recognized $7.6 million of license revenue during the year ended December 31, 2021. As of December 31, 2021, the initial transaction price of the single performance obligation of $9.5 million has been fully recognized as licensing revenue.

The following table presents a summary of the activity in the Company's deferred revenue during the year ended December 31, 2021 and 2020 (in thousands):

Deferred revenue, December 31, 2019	$	—
Additions		7,500
Revenue recognized		(1,900)
Deferred revenue, December 31, 2020		5,600
Additions		2,000
Revenue recognized		(7,600)
Deferred revenue, December 31, 2021	$	—

Cost of Contract Acquisition

The Company incurred contract acquisition costs (commissions) recorded as a contract asset amounting to approximately $1.4 million at inception of the 3DMed License Agreement which were capitalized under ASC 340-40 as incremental costs of obtaining the 3DMed License Agreement. These costs were amortized through general and administrative expense over the technology transfer period, commensurate with when the license revenue was recognized. The Company recognized $1.1 million and $0.3 million in expense associated with these costs during the years ended December 31, 2021 and 2020, respectively.

Cost of License Revenue

The Company incurred $0.2 million of sublicensing fees payable under its license from MSK in connection with the 3DMed License during the year ended December 31, 2021. There was no cost of license revenue during the year ended December 31, 2020.

12. Stock-Based Compensation

2017 Equity Incentive Plan

On December 29, 2017, the 2017 Equity Incentive Plan was approved by the stockholders of the Company, and currently allows for the issuance of up to a maximum of 24,204 shares of common stock underlying stock options granted prior to September 10, 2019. The 2017 Equity Incentive Plan was terminated upon the approval of the 2019 Incentive Plan subject to outstanding stock options granted under the 2017 Equity Incentive Plan that remain exercisable through maturity for the Company's employees and directors.

2019 Equity Incentive Plan

On September 10, 2019, the 2019 Equity Incentive Plan was approved by the stockholders of the Company, and currently allows for issuance of up to (i) 200,000 shares of common stock in connection with the grant of stock-based awards, including stock options, restricted stock, restricted stock units, stock appreciation rights and other types of awards as deemed appropriate plus (ii) any shares of common stock that are represented by awards granted under the Company's 2017 Equity Incentive Plan that are forfeited, expire or are cancelled without delivery of shares of common stock or which result in the forfeiture of shares of common stock back to the Company on or after September 10, 2019. As of December 31, 2021, an aggregate of 2,684 shares of common stock under the 2017 Equity Incentive Plan were forfeited subsequent to September 10, 2019 and are available for future issuance.

The number of shares reserved for issuance under the 2019 Equity Incentive Plan will automatically increase on January 1 of each year, for a period of not more than four years, commencing on January 1, 2020 and ending on (and including) January 1, 2023, by an amount equal to the lesser of (i) 5% of the total number of shares of common stock outstanding at the end of the prior fiscal year; and (ii) an amount determined by the board of directors or authorized committee. As of December 31, 2021, 449,476 shares of common stock were reserved for future grants under the 2019 Equity Incentive Plan. The number of shares reserved for issuance under the 2019 Equity Incentive Plan was automatically increased to 1,244,258 on January 1, 2022.

The following table summarizes the components of stock-based compensation expense in the consolidated statements of operations for the years ended December 31, 2021 and 2020, respectively (in thousands):

	Years Ended December 31,	
	2021	2020
Research and development	$ 126	$ 14
General and administrative	885	564
Total stock-based compensation	$ 1,011	$ 578

Options to Purchase Shares of Common Stock

The Company uses the Black-Scholes option-pricing model to estimate the fair value of stock-based awards and the following assumptions were used for stock options granted during the years ended December 31, 2021 and 2020, respectively:

	Years Ended December 31,	
	2021	2020
Risk free interest rate	1.05 %	0.62 %
Volatility	121.53 %	106.24 %
Expected lives (years)	6.18	6.15
Expected dividend yield	— %	— %

The weighted-average grant date fair value of options granted during the years ended December 31, 2021 and 2020 was $6.98 and $1.53, respectively.

The Company's expected common stock price volatility assumption is based upon the Company's own implied volatility in combination with the implied volatility of a basket of comparable companies. The expected life assumptions for employee grants were based upon the simplified method, which averages the contractual term of the Company's options of ten years with the average vesting term of four years for an average of six years. The expected life assumptions for non-employees were based upon the contractual term of the option. The dividend yield assumption is zero because the Company has never paid cash dividends and presently has no intention to do so. The risk-free interest rate used for each grant was also based upon prevailing short-term interest rates. The

Company accounts for forfeitures as they occur, therefore, outstanding stock options equal vested and expected to vest stock options.

As of December 31, 2021, there was $2.1 million of unrecognized compensation cost related to outstanding stock options that is expected to be recognized as a component of the Company's operating expenses over a weighted-average period of 2.69 years.

The following table summarizes stock option activity of the Company for the years ended December 31, 2021 and 2020, respectively:

	Total Number of Shares (in thousands)	Weighted Average Exercise Price Per Share	Weighted Average Remaining Contractual Term (in years)	Aggregate Intrinsic Value (in thousands)
Outstanding at January 1, 2020	22	$ 112.81		
Granted	186	1.87		
Outstanding at December 31, 2020	208	13.38		
Granted	326	8.00		
Outstanding at December 31, 2021	534	$ 10.09	8.77	$ 681
Vested and exercisable at December 31, 2021	111	$ 20.39	8.01	$ 345

The aggregate intrinsic values of outstanding and exercisable stock options at December 31, 2021 were calculated based on the closing price of the Company's common stock as reported on the Nasdaq Capital Market on December 31, 2021 of $5.53 per share. The aggregate intrinsic value equals the positive difference between the closing fair market value of the Company's common stock and the exercise price of the underlying stock options.

Time-Vested RSUs and RSUs with Performance Conditions

The Company granted RSUs pursuant to the Company's 2019 Equity Incentive Plan that will settle in shares of common stock. As of December 31, 2021, there was $0.6 million of unrecognized compensation cost related to outstanding RSUs that is expected to be recognized as a component of the Company's operating expenses over a weighted-average period of 2.39 years.

The following table summarizes RSU activity of the Company for the years ended December 31, 2021 and 2020, respectively:

	Total Number of Shares (in thousands)	Weighted Average Grant Date Fair Value Per Share
Unvested at December 31, 2019	—	$ —
Granted	170	$ 1.89
Vested	—	$ —
Unvested at December 31, 2020	170	$ 1.89
Granted	40	$ 8.00
Vested	(10)	$ 8.00
Unvested at December 31, 2021	200	$ 2.81

2021 Employee Stock Purchase Plan

On April 22, 2021, the Board of Directors adopted the 2021 Employee Stock Purchase Plan ("2021 ESPP") which was approved by the Company's stockholders on June 8, 2021. The 2021 ESPP allows employees to

contribute up to 20% of their cash earnings, subject to a maximum of $25,000 per year under Internal Revenue Service rules, to be used to purchase shares of the Company's common stock on semi-annual purchase dates. The 2021 ESPP allows eligible employees to purchase shares of common stock at a price per share equal to 85% of the lower of the fair market value of the common stock at the beginning or end of each six-month offering period during the term of the 2021 ESPP. The first offering period began in September 2021. There are currently 300,000 shares of common stock reserved for issuance under the 2021 ESPP.

2017 Employee Stock Purchase Plan

The Company also has the 2017 Employee Stock Purchase Plan ("2017 ESPP"). As of December 31, 2021, the Board of Directors has not established the various parameters under the 2017 ESPP and no shares have been delivered under the 2017 ESPP. There are 11,302 shares of common stock reserved for issuance under the 2017 ESPP as of December 31, 2021.

13. Income Taxes

The Company's loss before income taxes is as follows (in thousands):

	As of December 31,	
	2021	2020
U.S.	$ (6,956)	$ (4,664)
Non - U.S.	(13,980)	(12,110)
	$ (20,936)	$ (16,774)

The components of federal and state income tax (benefit) are as follows (in thousands):

	As of December 31,	
	2021	2020
Current		
Federal	$ —	$ —
State	2	5
Foreign	—	—
Total current	2	5
Deferred expense		
Federal	(239)	—
State	—	(22)
Foreign	—	—
Total deferred	(239)	(22)
Total income tax benefit	$ (237)	$ (17)

The components of net deferred tax assets are as follows (in thousands):

	As of December 31,	
	2021	2020
Net operating loss carryforwards	$ 9,059	$ 7,155
Stock-based compensation	140	75
Licensing deduction deferral	3,236	4,059
Contingent consideration	62	973
Lease liability	170	208
Other	217	190
Gross deferred tax assets	12,884	12,660
Valuation allowance	(12,732)	(11,514)
Net deferred tax assets	$ 152	$ 1,146

The components of gross deferred tax liabilities are as follows (in thousands):

	As of December 31,	
	2021	2020
In-process research and development not subject to future amortization for tax purposes	$ —	$ 1,197
Right of use asset	152	188
Gross deferred tax liability	$ 152	$ 1,385

The net deferred tax liabilities are as follows (in thousands):

	As of December 31,	
	2021	2020
Net deferred tax asset	$ 152	$ 1,146
Gross deferred tax liability	152	1,385
Net deferred tax liability	$ —	$ 239

The provision for income taxes differs from the provision computed by applying the federal statutory rate to net loss before income taxes as follows:

	As of December 31,	
	2021	2020
U.S. federal statutory income tax rate	(21.0)%	(21.0)%
State and local taxes, net of federal benefit	(0.2)%	2.5 %
Foreign rate differential	14.0 %	15.2 %
Permanent differences	0.2 %	0.2 %
Contingent consideration	— %	0.1 %
Other	0.1 %	11.0 %
Valuation allowance	5.8 %	(8.1)%
Effective income tax rate	(1.1)%	(0.1)%

At December 31, 2021, the Company had domestic federal and state net operating loss carryforwards of approximately $42.6 million and $2.0 million, respectively, available to reduce future taxable income, which expire

beginning in 2027. The income tax benefit for the years ended December 31, 2021 and 2020 relates to the indefinite lived deferred tax liabilities.

Under the provisions of the Internal Revenue Code, the net operating losses ("NOL") and tax credit carryforwards are subject to review and possible adjustment by the Internal Revenue Service and state tax authorities. NOL 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%, as defined under Sections 382 and 383 of the Internal Revenue Code of 1986, respectively, as well as similar state tax provisions. This could limit the amount of tax attributes that the Company can utilize annually to offset future taxable income or tax liabilities. The amount of the annual limitation, if any, will be determined based on the value of the Company immediately prior to the ownership change. Subsequent ownership changes may further affect the limitation in future years. The Company has completed several financings since its inception, which may have resulted in a change in control as defined by Sections 382 and 383 of the Internal Revenue Code, or could result in a change in control in the future. Utilization of the net operating loss and tax credits carryforwards may be limited by "ownership change" rules, as defined in Section 382 of the Internal Revenue Code of 1986, as amended, and similar state provisions. This annual limitation may result in the expiration of the net operating losses and credits before utilization.

In assessing the need for a valuation allowance the Company may utilize indefinite-lived deferred tax liabilities from an indefinite-lived intangible asset as a future source of income. The Company's IPR&D, as recorded in acquisition accounting, can be utilized as a source of income arising from the future reversal of temporary difference that can be offset against post 2017 indefinite-lived NOLs. Therefore, the Company is permitted to offset the indefinite-lived deferred tax liability up to the 80 percent limitation for NOL's generated subsequent to January 1, 2018. The valuation allowance increased by $1.2 million for the year ended December 31, 2021, which was driven by the impairment charge recorded on the Company's IPR&D during the current year and resulting decrease in the related deferred tax liability.

The Company files income tax returns in the United States and various state jurisdictions. The Company is subject to tax examinations for the 2015 tax year and beyond. The Company does not recognize tax benefits that are not more-likely-than-not to be supported based upon the technical merits of the tax position taken. In assessing its unrecognized tax benefits, the Company has analyzed its tax return filing positions in all of the federal, state and foreign filing jurisdictions where it is required to file income tax returns, as well as all open years in those jurisdictions.

As of December 31, 2021, the Company has no unrecognized tax benefits or accrued interest or penalties associated with uncertain tax positions. The Company does not believe that it is reasonably possible that its unrecognized tax benefits would significantly change in the following 12 months.

In assessing the realizability of deferred tax assets, management considers whether it is more-likely-than-not that some portion or all of the deferred tax assets will not be realized in the near term. The ultimate realization of deferred tax assets is dependent upon the generation of future taxable income during the periods in which those temporary differences become deductible.

In response to the COVID-19 pandemic, the Coronavirus Aid, Relief and Economic Securities Act (CARES Act) was signed into law in the US in March 2020. The American Rescue Plan Act of 2021 ("American Rescue Plan") was subsequently signed into law on March 11, 2021 as a follow on to the CARES act to provide additional relief in connection with the ongoing COVID-19 pandemic. The CARES Act and American Rescue Plan adjusted a number of provisions in the tax code, including, among other things, the calculation and eligibility of certain deductions, the treatment of net operating losses and tax credits, provisions relating to PPP loan extension The enactment of the CARES Act and American Rescue Plan did not have a material impact on the Company's income tax provision or consolidated financial statements for the years ended December 31, 2021 and 2020.

14. Employee Benefit Plan

The Company sponsors a 401(k) Plan. Employees become eligible for participation upon the start of employment. Participants may elect to have a portion of their salary deferred and contributed to the 401(k) Plan up

to the limit allowed under the Internal Revenue Code. The Company makes a matching contribution to the plan for each participant who has elected to make tax-deferred contributions for the plan year. The Company made matching contributions which amounted to approximately $75,000 and $43,000 for the years ended December 31, 2021 and 2020, respectively. These amounts were charged to the consolidated statements of operations. The employer contributions vest immediately.

15. Subsequent Events

The Company evaluated all events or transactions that occurred after December 31, 2021 up through the date these consolidated financial statements were issued. Other than as disclosed below and elsewhere in the notes to the consolidated financial statements, the Company did not have any material subsequent events.

ITEM 9. CHANGES IN AND DISAGREEMENTS WITH ACCOUNTANTS ON ACCOUNTING AND FINANCIAL DISCLOSURES

None.

ITEM 9A. CONTROLS AND PROCEDURES

Evaluation of Disclosure Controls and Procedures

The term “disclosure controls and procedures” means our controls and other procedures that are designed to ensure that information required to be disclosed by us in the reports that we file or submit under the Securities Exchange Act of 1934, as amended, or the Exchange Act, is recorded, processed, summarized and reported, within the time periods specified in the SEC’s rules and forms. Disclosure controls and procedures include, without limitation, controls and procedures designed to ensure that information required to be disclosed by us in the reports that we file or submit under the Exchange Act is accumulated and communicated to our management, including our principal executive officer who is also acting as our principal financial officer, or persons performing similar functions, as appropriate to allow timely decisions regarding required disclosure.

We carried out an evaluation, under the supervision and with the participation of our management, including our principal executive officer who is also acting as our acting principal financial officer, of the effectiveness of our disclosure controls and procedures (as defined in Exchange Act Rules 13a – 15(e) and 15d – 15(e)). Based upon that evaluation, our principal executive officer who is also acting as our principal financial officer concluded that, as of the end of the period covered in this report, our disclosure controls and procedures were effective to ensure that information required to be disclosed in reports filed under the Exchange Act is recorded, processed, summarized and reported within the required time periods and is accumulated and communicated to our management, including our principal executive officer who is also acting as our principal financial officer, as appropriate to allow timely decisions regarding required disclosure.

Our principal executive officer who is also acting as our principal financial officer does not expect that our disclosure controls or internal controls will prevent all error and all fraud. Although our disclosure controls and procedures were designed to provide reasonable assurance of achieving their objectives, a control system, no matter how well conceived and operated, can provide only reasonable, but not absolute assurance that the objectives of the system are met. Further, the design of a control system must reflect the fact that there are resource constraints, and the benefits of controls must be considered relative to their costs. Because of the inherent limitations in all control systems, no evaluation of controls can provide absolute assurance that all control issues and instances of fraud, if any, within our company have been detected. These inherent limitations include the realities that judgments in decision-making can be faulty, and that breakdowns can occur because of a simple error or mistake. Additionally, controls can be circumvented if there exists in an individual a desire to do so. There can be no assurance that any design will succeed in achieving its stated goals under all potential future conditions.

Management’s Report on Internal Control Over Financial Reporting

Our management is responsible for establishing and maintaining adequate internal control over financial reporting, as such term is defined in Exchange Act Rules 13a-15(f) and 15d-15(f). Under the supervision and with the participation of our Chief Executive Officer and Senior Vice President, Finance and Chief Accounting Officer, our management conducted an evaluation of the effectiveness of our internal control over financial reporting based on the framework in *Internal Control—Integrated Framework (2013)* issued by the Committee of Sponsoring Organizations of the Treadway Commission. Based on that evaluation, our management concluded that our internal control over financial reporting was effective as of December 31, 2021.

Attestation Report of the Independent Registered Public Accounting Firm

This report does not include an attestation report of our independent registered public accounting firm regarding internal control over financial reporting. Management's report was not subject to attestation by our independent registered public accounting firm pursuant to Section 989G of the Dodd-Frank Wall Street Reform and Consumer Protection Act, which exempts smaller reporting companies from the auditor attestation requirement.

Changes in Internal Control over Financial Reporting

There has been no change in our internal control over financial reporting (as defined in Rule 13a-15(f) and 15d-15(f) under the Exchange Act) that occurred during the year ended December 31, 2021 that has materially affected, or is reasonably likely to materially affect, our internal control over financial reporting.

ITEM 9B. OTHER INFORMATION

None.

PART III

ITEM 10. DIRECTORS, EXECUTIVE OFFICERS AND CORPORATE GOVERNANCE

The information required by item 10 is incorporated herein by reference from the Company's Proxy Statement, which will be filed with the SEC within 120 days after the end of the Company's 2021 fiscal year pursuant to Regulation 14A for its 2022 Annual Meeting of Stockholders.

ITEM 11. EXECUTIVE COMPENSATION

The information required by item 11 is incorporated herein by reference from the Company's Proxy Statement, which will be filed with the SEC within 120 days after the end of the Company's 2021 fiscal year pursuant to Regulation 14A for its 2022 Annual Meeting of Stockholders.

ITEM 12. SECURITY OWNERSHIP OF CERTAIN BENEFICIAL OWNERS AND MANAGEMENT AND RELATED STOCKHOLDER MATTERS

The information required by item 12 is incorporated herein by reference from the Company's Proxy Statement, which will be filed with the SEC within 120 days after the end of the Company's 2021 fiscal year pursuant to Regulation 14A for its 2022 Annual Meeting of Stockholders.

ITEM 13. CERTAIN RELATIONSHIPS AND RELATED PARTY TRANSACTIONS, AND DIRECTOR INDEPENDENCE

The information required by item 13 is incorporated herein by reference from the Company's Proxy Statement, which will be filed with the SEC within 120 days after the end of the Company's 2021 fiscal year pursuant to Regulation 14A for its 2022 Annual Meeting of Stockholders.

ITEM 14. PRINCIPAL ACCOUNTANT FEES AND SERVICES

The information required by item 14 is incorporated herein by reference from the Company's Proxy Statement, which will be filed with the SEC within 120 days after the end of the Company's 2021 fiscal year pursuant to Regulation 14A for its 2022 Annual Meeting of Stockholders.

PART IV

ITEM 15. EXHIBITS

Exhibit Number	Description	Form	Exhibit	Filing Date
2.1^	Agreement and Plan of Merger, dated as of August 7, 2017, by and among the Registrant, Galena Bermuda Merger Sub, Ltd., Sellas Intermediate Holdings I, Inc., Sellas Intermediate Holdings II, Inc. and SELLAS Life Sciences Group Ltd, as amended (included as Annex A to the proxy statement/prospectus/consent solicitation statement)	8-K	2.1	August 8, 2017
3.1	Composite Amended and Restated Certificate of Incorporation of the Registrant (formerly, Galena Biopharma, Inc.), amended as of December 27, 2017	10-K	3.1	April 13, 2018
3.2	Certificate of Designation of Preferences, Rights and Limitations of Series A Convertible Preferred Stock	8-K	3.1	March 12, 2018
3.3	Certificate of Amendment to the Amended and Restated Certificate of Incorporation of the Registrant	8-K	3.1	November 6, 2019
3.4	Amended and Restated By-Laws of the Registrant	8-K	3.3	January 5, 2018
4.1	Form of Common Stock Certificate	10-K	4.1	April 13, 2018
4.2	Form of Contingent Value Rights Agreement among the Registrant (formerly RXi Pharmaceuticals Corporation), Computershare Trust Company, N.A., Computershare Inc., and Robert E Kennedy, dated April 13, 2011	8-K	10.1	April 14, 2011
4.3	First Amendment to Contingent Value Rights Agreement among the Registrant (formerly RXi Pharmaceuticals Corporation), Computershare Trust Company, N.A., Computershare Inc., and Robert E Kennedy, dated February 15, 2012	10-K	10.2	March 28, 2012
4.4	Warrant issued to EQC Private Markets SAC Fund Ltd – EQC Biotech Sely I Fund	8-K	10.5	January 5, 2018
4.5	Warrant Agreement including form of accompanying Common Warrant as Exhibit B thereto, dated as of July 16, 2018, among the Registrant, Computershare, Inc., and Computershare Trust Company N.A.	8-K	10.1	July 18, 2018
4.6	Amendment to Warrant Agreement including form of accompanying Common Warrant as Exhibit B thereto, dated as of July 16, 2018, among the Registrant, Computershare, Inc., and Computershare Trust Company N.A.	8-K	10.2	July 9, 2019
4.7	Form of Warrant issued in exchange of Series A Preferred Stock in connection with July 2018 public offering	8-K	10.3	July 18, 2018
4.8	Form of New Warrant issued in connection with Warrant Exercise Agreement dated March 6, 2019	8-K	4.1	March 6, 2019
4.9	Warrant Agreement, including form of accompanying Common Warrant as Exhibit B thereto, dated as of June 18, 2019, among the Registrant, Computershare Inc., and Computershare Trust Company N.A.	8-K	10.1	June 18, 2019
4.10	Form of Pre-Funded Warrant in connection with June 2019 public offering	8-K	10.2	June 18, 2019
4.11	Form of Warrant in connection with January Registered Direct 2020	8-K	4.1	January 10, 2020
4.12	Form of Pre-Funded Warrant in connection with January registered Direct 2020 Offering	8-K	4.2	January 10, 2020
4.13	Form of Warrant in connection with July 2020 Private Placement	8-K	4.1	August 4, 2020
4.14	Form of Warrant issued pursuant to that certain Securities Purchase Agreement dated March 7, 2018 by and between the Registrant and certain investors	8-K	4.1	March 12, 2018

Exhibit Number	Description	Form	Exhibit	Filing Date
4.15	Description of Securities	10-K	4.41	March 13, 2020
9.1	Securities Purchase Agreement dated March 7, 2018 by and between the Registrant and certain investors	8-K	10.1	March 12, 2018
10.1*	SELLAS Life Sciences Group, Ltd Stock Incentive Plan #1	S-4/A	10.61	October 30, 2017
10.2*	Form of Restricted Stock Unit Grant and Agreement under SELLAS Life Sciences Group Ltd Stock Incentive Plan #1	S-4/A	10.63	October 30, 2017
10.3*	2017 Equity Incentive Plan of the Registrant	8-K	10.10	January 5, 2018
10.4*	2017 Employee Stock Purchase Plan of the Registrant	8-K	10.11	January 5, 2018
10.5*	Form of Stock Option Grant Notice and Option Agreement under the 2017 Equity Incentive Plan.	8-K	10.2	March 19, 2018
10.6*	Form of Restricted Stock Unit Grant and Agreement under the 2017 Equity Incentive Plan.	10-K	10.9	April 13, 2018
10.7*	Employment Agreement by and between the Registrant and Angelos Stergiou, effective July 1, 2019	10-Q	10.3	May 14, 2020
10.8*	Letter Employment Agreement by and between the Registrant and Barbara Wood, dated March 14, 2018	8-K	10.1	March 19, 2018
10.9*	Employment Agreement by and between the Registrant and John Burns, effective as of January 11, 2018	8-K	10.1	January 18, 2018
10.10*	Change in Control Severance Agreement by and between the Registrant and Dragan Cicic, M.D.	8-K	10.1	December 16, 2021
10.11+	Patent and Technology License Agreement, dated September 11, 2006, by and among the Board of Regents of the University of Texas System, the University of Texas M.D. Anderson Cancer Center, the Henry M. Jackson Foundation for the Advancement of Military Medicine, Inc., and Apthera, Inc. (formerly Advanced Peptide Therapeutics, Inc.)	10-Q	10.1	August 15, 2011
10.12	Amendment No. 1 to Patent and Technology License Agreement, dated December 21, 2007, by and among the Board of Regents of the University of Texas System, the University of Texas M.D. Anderson Cancer Center, the Henry M. Jackson Foundation for the Advancement of Military Medicine, Inc., and Apthera, Inc. (formerly Advanced Peptide Therapeutics, Inc.)	10-Q	10.2	August 15, 2011
10.13	Amendment No. 2 to Patent and Technology License Agreement, dated September 3, 2008, by and among the Board of Regents of the University of Texas System, the University of Texas M.D. Anderson Cancer Center, the Henry M. Jackson Foundation for the Advancement of Military Medicine, Inc., and Apthera, Inc. (formerly Advanced Peptide Therapeutics, Inc.)	10-Q	10.3	August 15, 2011
10.14	Amendment No. 3 to Patent and Technology License Agreement, dated July 8, 2009, by and among the Board of Regents of the University of Texas System, the University of Texas M.D. Anderson Cancer Center, the Henry M. Jackson Foundation for the Advancement of Military Medicine, Inc., and Apthera, Inc. (formerly Advanced Peptide Therapeutics, Inc.)	10-Q	10.4	August 15, 2011
10.15+	Amendment No. 4 to Patent and Technology License Agreement, dated February 11, 2010, by and among the Board of Regents of the University of Texas System, the University of Texas M.D. Anderson Cancer Center, the Henry M. Jackson Foundation for the Advancement of Military Medicine, Inc., and Apthera, Inc. (formerly Advanced Peptide Therapeutics, Inc.)	10-Q	10.5	August 15, 2011

Exhibit Number	Description	Form	Exhibit	Filing Date
10.16+	Amendment No. 5 to Patent and Technology License Agreement, dated January 10, 2011, by and among the Board of Regents of the University of Texas System, the University of Texas M.D. Anderson Cancer Center, the Henry M. Jackson Foundation for the Advancement of Military Medicine, Inc., and Apthera, Inc. (formerly Advanced Peptide Therapeutics, Inc.)	10-Q	10.6	August 15, 2011
10.17	Scientific Advisory Agreement between the Registrant (formerly Galena Biopharma, Inc.) and George E. Peoples, Ph.D., dated April 13, 2011	10-Q	10.10	August 15, 2011
10.18+	Exclusive License Agreement, dated as of July 11, 2011, by and among The Henry M. Jackson Foundation for the Advancement of Military Medicine, Inc., the Registrant (formerly Galena Biopharma, Inc.) and its wholly owned subsidiary, Apthera, Inc.	10-Q	10.12	August 15, 2011
10.19+	Exclusive License Agreement, dated as of September 16, 2011, by and among The Henry M. Jackson Foundation for the Advancement of Military Medicine, Inc., The Board of Regents of the University of Texas System, The University of Texas M. D. Anderson Cancer Center and the Registrant (formerly Galena Biopharma, Inc.)	8-K	10.1	September 21, 2011
10.20+	License Agreement, effective as of April 30, 2009, between Kwangdong Pharmaceutical Co., Ltd. and Apthera, Inc.	10-K	10.45	March 28, 2012
10.21	Amendment No. 1 to License Agreement, dated as of January 13, 2012, by and among Apthera, Inc., Kwangdong Pharmaceutical Co., Ltd., and the Registrant	10-K	10.46	March 28, 2012
10.22+	License and Supply Agreement, effective December 3, 2012, by and between the Registrant and ABIC Marketing Limited, a subsidiary of Teva Pharmaceuticals	10-K	10.43	March 12, 2013
10.23+	License and Development Agreement, dated January 13, 2014, between the Registrant and Dr. Reddy's Laboratories, Ltd.	10-K	10.36	March 17, 2014
10.24+	Exclusive License Agreement, dated as of December 20, 2013, between Mills Pharmaceuticals, LLC and BioVascular, Inc.	10-K	10.37	March 17, 2014
10.25	Amendment of the Exclusive License Agreement by and between Mills Pharmaceuticals, LLC and BioVascular, Inc.	8-K	10.1	September 11, 2017
10.26+	Amended and Restated Exclusive License Agreement by and between SELLAS Life Sciences Group Ltd and Memorial Sloan Kettering Cancer Center, effective October 11, 2017	S-4/A	10.65	October 30, 2017
10.27	Form of Indemnity Agreement between the Registrant and each of its directors and executive officers	8-K	10.8	January 5, 2018
10.28	Form of Warrant Exercise Agreement dated March 6, 2019	8-K	10.1	March 6, 2019
10.29*	2019 Equity Incentive Plan	S-8	99.1	March 13, 2020
10.30*	Form of Stock Option Grant Notice and Option Agreement under the 2019 Equity Incentive Plan.	10-K	10.48	March 13, 2020
10.31*	Form of Restricted Stock Unit Grant and Agreement under the 2019 Equity Incentive Plan.	10-K	10.49	March 13, 2020
10.32	Amendment to Warrant to Purchase Common Stock dated January 2, 2020 between the Registrant and the holders	8-K	10.1	January 7, 2020
10.33	Securities Purchase Agreement dated January 9, 2020 between the Registrant and certain Investors	8-K	10.1	January 10, 2020
10.34	Form of Placement Agent Agreement	8-K	1.1	January 10, 2020
10.35	Sublease dated June 5, 2020 between the Registrant and Riemer & Braunstein LLP	8-K	10.1	June 11, 2020
10.36	First Amendment to Sublease dated December 6, 2021 between the Registrant and Riemer & Braunstein LLP			

Exhibit Number	Description	Form	Exhibit	Filing Date
10.37*	2021 Employee Stock Purchase Plan	S-8	99.4	August 13, 2021
10.38	Securities Purchase Agreement dated July 31, 2020 between the Registrant and certain institutional and accredited investors	8-K	10.1	August 4, 2020
10.39	Form of Registration Rights Agreement	8-K	10.2	August 4, 2020
10.40	Exclusive License Agreement dated December 7, 2020 among the Registrant, SLSG Limited, LLC and 3D Medicines Inc.	8-K	10.1	January 28, 2021
10.41	Share Purchase Agreement dated December 13, 2020 between the Registrant and certain investors	8-K	10.1	December 14, 2020
10.42	Termination Agreement between the Registrant, The Henry M. Jackson Foundation, and the MD Anderson Cancer Center, dated February 4, 2021	10-K	10.50	March 23, 2021
10.43	Controlled Equity Offering℠ Sales Agreement, dated as of April 16, 2021, by and among SELLAS Life Sciences Group, Inc. and Cantor Fitzgerald & Co.	S-3	1.2	April 16, 2021
14.1	Code of Business Conduct and Ethics	8-K	14.1	January 5, 2018
21.1	Subsidiaries of the Registrant			
23.1	Consent of Moss Adams LLP, Independent Registered Public Accounting Firm			
24.1	Powers of Attorney (included on signature page hereto)			
31.1	Certification of Principal Executive Officer pursuant to Rule 13a-14(a) and Rule 15d-14(a) of the Securities and Exchange Act, as amended			
31.2	Certification of Principal Financial Officer pursuant to Rule 13a-14(a) and Rule 15d-14(a) of the Securities and Exchange Act, as amended			
32.1**	Certification of Principal Executive Officer and Principal Financial Officer pursuant to 18 U.S.C. 1350, as adopted pursuant to Section 906 of the Sarbanes-Oxley Act of 2002			
101.INS***	XBRL Instance Document.			
101.SCH***	XBRL Taxonomy Extension Schema.			
101.CAL***	XBRL Taxonomy Extension Calculation Linkbase.			
101.DEF***	XBRL Taxonomy Extension Definition Linkbase.			
101.LAB***	XBRL Taxonomy Extension Label Linkbase.			
101.PRE***	XBRL Taxonomy Extension Presentation Linkbase.			

*	Indicates management contract or compensatory plans or arrangements.
**	The certification attached as Exhibit 32.1 pursuant to 18 U.S.C. Section 1350, as adopted pursuant to Section 906 of the Sarbanes-Oxley Act of 2002, and shall not be deemed “filed” by the Company for purposes of Section 18 of the Securities Exchange Act of 1934, as amended, or otherwise subject to the liability of that section, nor shall it be deemed incorporated by reference into any filing of the registrant under the Securities Act of 1933, as amended, or the Securities Exchange Act of 1934, as amended, whether made before or after the date hereof, regardless of any general incorporation language in such filing.
^	The schedules and exhibits to this exhibit have been omitted pursuant to Item 601(b)(2) or 601(b)(10)(iv), as applicable, of Regulation S-K. A copy of any omitted schedule and/or exhibit will be furnished to the SEC upon request.
+	Confidential treatment has been granted with respect to certain portions of this exhibit. Omitted portions have been filed separately with the SEC.
***	In accordance with Rule 406T of Regulation S-T, the Interactive Data Files in Exhibit 101 are deemed not filed or part of a registration statement or prospectus for purposes of Sections 11 or 12 of the Securities Act of 1933, as amended, are deemed not filed for purposes of Section 18 of the Exchange Act of 1934, as amended, and otherwise are not subject to liability under these sections.

ITEM 16. FORM 10-K SUMMARY

None.

SIGNATURES

Pursuant to the requirements 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.

SELLAS Life Sciences Group, Inc.

Date: March 31, 2022 By: */s/ Angelos M. Stergiou*

Angelos M. Stergiou, MD, ScD h.c.
President and Chief Executive Officer

KNOW ALL PERSONS BY THESE PRESENTS, that each person whose signature appears below constitutes and appoints Angelos Stergiou and Barbara A. Wood, and each of them, as his or her true and lawful attorneys-in-fact and agents, each with the full power of substitution, for him or her and in his or her name, place or stead, in any and all capacities, to sign any and all amendments (including post-effective amendments) to this annual report on Form 10-K, and to file the same, with exhibits thereto and other documents in connection therewith, with the Securities and Exchange Commission, granting unto said attorneys-in-fact and agents, and each of them, full power and authority to do and perform each and every act and thing requisite and necessary to be done in and about the premises, as fully to all intents and purposes as he or she might or could do in person, hereby ratifying and confirming all that said attorneys-in-fact and agents, or their, his or her substitute or substitutes, may lawfully do or cause to be done by virtue hereof.

In accordance with the Securities Exchange Act of 1934, this report has been signed below by the following persons on behalf of the registrant in the capacities and on the dates indicated.

Signature	Title	Date
/s/ Angelos M. Stergiou Angelos M. Stergiou, M.D., ScD h.c.	President, Chief Executive Officer and Director (Principal Executive Officer and Principal Financial Officer)	March 31, 2022
/s/ John T. Burns John T. Burns, CPA	Senior Vice President, Finance and Chief Accounting Officer (Principal Accounting Officer)	March 31, 2022
/s/ Jane Wasman Jane Wasman	Chair of the Board of Directors	March 31, 2022
/s/ David Scheinberg David Scheinberg, M.D., PhD.	Director	March 31, 2022
/s/ Robert Van Nostrand Robert Van Nostrand	Director	March 31, 2022
/s/ John Varian John Varian	Director	March 31, 2022

Exhibit 10.36

Pursuant to Item 601(b)(10)(iv) of Regulation S-K, certain identified information marked with [***] has been excluded from the exhibit, because it is both not material and is the type of information that the Registrant treats as private or confidential.

FIRST AMENDMENT TO SUBLEASE

THIS FIRST AMENDMENT TO SUBLEASE ("First Amendment" or "this Amendment") is made as of this 6th day of December, 2021, by and between **RIEMER** & **BRAUNSTEIN LLP,** a Massachusetts limited liability partnership, as Sublandlord, and **SELLAS LIFE SCIENCES GROUP, INC.,** a New York corporation, as Subtenant.

RECITALS:

A. Reference is made to a certain Sublease dated June 5, 2020, by and between Sublandlord and Subtenant (the **"Sublease"),** as modified by that certain Confirmation of Sublease Terms and Dates dated as of July 16, 2020, demising premises containing approximately 5,143 rentable square feet of space in Suite No. 2503 on the twenty-fifth (25th) floor of the building known as and numbered 7 Times Square, New York, New York (the **"Building")** pursuant to a certain Amended and Restated Lease dated December 31, 2013 (the **"Lease"),** made by and between Times Square Tower Associates LLC, a Delaware limited liability company as landlord (the **"Landlord")** and Sublandlord as tenant as described in the Sublease.

B. Sublandlord and Subtenant now desire to amend the Sublease pursuant to which Sublandlord shall lease to Subtenant and Subtenant shall lease from Sublandlord certain additional premises in the Building.

AGREEMENTS:

NOW, THEREFORE, in consideration of the mutual covenants and agreements contained herein, and for other good and valuable consideration, the receipt and sufficiency of which are hereby acknowledged, Sublandlord and Subtenant hereby agree that the Sublease is hereby amended as follows:

1. Capitalized Terms. All capitalized terms used but not defined in this Amendment shall have the same meanings given them in the Sublease.

2. Demise of Additional Premises. Sublandlord hereby leases to Subtenant and Subtenant hereby leases from Sublandlord additional premises containing approximately 3,312 rentable square feet located on the twenty-fifth (25th) floor of the Building located adjacent to the Sublet Premises substantially as shown on First Amendment Exhibit A, a copy of which is attached hereto and incorporated herein by reference (the **"Additional Premises").** The demise of the Additional Premises to Subtenant shall be upon all of the same terms and conditions as set forth in the Sublease, except as otherwise expressly stated in this Amendment. The Sublease Commencement Date and Sublease Rent Commencement Date in respect of the Additional Premises shall be the date when all of the following have occurred: (i) Sublandlord and Subtenant shall have fully executed and delivered this Amendment, (ii) Landlord, Sublandlord and Subtenant shall have executed and delivered an Acceptable Consent in respect of the Additional Premises (with respect to such Acceptable Consent, (x) the terms and provisions of Section 25 of the Sublease shall be applicable, and (y) the form shall be acceptable if substantially in form and content similar to Landlord's Consent to Sublease dated June 15, 2020); (iii) Sublandlord shall have substantially completed Sublandlord's Work as defined below in this Amendment; (iv) Sublandlord delivers the Additional Premises to Subtenant vacant, broom clean and free of any occupancy; and (v) Sublandlord shall have given to Subtenant five (5) days' written notice that the foregoing conditions have

been fulfilled and the date that the Sublet Premises shall be delivered to Subtenant. The term of the Sublease in respect of the Additional Premises shall expire on the Sublease Termination Date stated in the Sublease, on December 30, 2024. The original Sublet Premises and the Additional Premises together shall contain approximately 8,455 total rentable square feet.

3. Annual Rent in respect of the Additional Premises. Commencing as of the above- referenced Sublease Rent Commencement Date the Annual Rent in respect of the Additional Premises shall be as set forth below. In lieu of operating expense and real estate tax escalations, Subtenant has agreed to pay to Sublandlord an annual increase in the Annual Rent throughout the term of this Sublease in the amount of three percent (3.0%), which increase shall commence on the first (1st) anniversary of the Sublease Rent Commencement Date and on each anniversary of the Sublease Rent Commencement Date thereafter falling during the term of the Sublease, and is included in the calculation of the Annual Rent as set forth below.

Lease Year	Annual Rent	Monthly Payment
Sublease Rent Commencement Date - one day prior to the 1st anniversary of the Sublease Commencement Date	$192,096.00	$16,008.00
1st anniversary of the Sublease Rent Commencement Date - one day prior to the 2nd anniversary of the Sublease Rent Commencement Date	$197,858.88	$16,488.24
2nd anniversary of the Sublease Rent Commencement Date - one day prior to the 3rd anniversary of the Sublease Rent Commencement Date	$203,794.65	$16,982.89
3rd anniversary of the Sublease Rent Commencement Date - through Sublease Termination Date	$209,908.49	$17,492.37

4. Electricity Component. Notwithstanding the terms and provisions of Section 7(i) of the Sublease, with respect to the Additional Premises, the Electricity Component shall be in addition to, and not included in, the Annual Rent in the figures shown in the above table at the rate of Three and 25/100 Dollars ($3.25) per square foot of the Additional Premises. For purposes of clarity, the Electricity Component shall increase the Annual Rent by $10,764.00 annually and $897.00 monthly.

5. Condition of the Additional Premises. Subtenant acknowledges that Subtenant has inspected the condition of the Additional Premises and has found them to be acceptable, and agrees, except as provided for below, to accept the Additional Premises in "AS IS" condition as of the date hereof, and that Sublandlord has made no representations, express or implied, with respect to the condition of the Sublet Premises or their suitability for Subtenant's use and occupancy. Except as expressly provided herein, Sublandlord shall have no obligation to prepare the Additional Premises for Subtenant's initial occupancy or otherwise to incur any cost with respect to Subtenant's initial occupancy. The foregoing notwithstanding, Sublandlord, at its own cost and expense, shall perform the following work **("Sublandlord's Work")** to prepare the Additional Premises for Subtenant's occupancy (as shown conceptually on Exhibit A, annexed hereto): (i) demolish a portion of the existing demising wall separating the original Sublet Premises from the Additional Premises in two (2) locations to be mutually agreed upon; (ii) at sublandlord's option, construct a fill-in demising wall or fire-rated exit to separate the Additional Premises from the remainder of Sublandlord's premises on the twenty-fifth (25th) floor; and (iii) shampoo the carpet in the Additional Premises. Sublandlord shall perform Sublandlord's Work in such manner so

as to minimize to the greatest extent reasonably practicable any interference with or disruption of Subtenant's use of the original Sublet Premises and the conduct of its business therein, understanding that there will have to be construction in a portion of the original Sublet Premises requiring Sublandlord's unfettered access to the original Sublet Premises for that purpose, provided that there shall be no diminution of Annual Rent or other charges in respect of the original Sublet Premises by reason of the performance of Sublandlord's Work. Sublandlord shall perform, or cause to be performed, Sublandlord's Work in a good and workerlike manner, in material compliance with all applicable Legal Requirements, including without limitation the Americans with Disabilities Act of 1990, as amended. The term "substantially completed" or words of similar import shall mean the date when Sublandlord's Work is completed in material compliance with all applicable Legal Requirements other than minor or insubstantial details of construction, including without limitation, touch up painting and patching and minor items of decoration, finish, detail and/or mechanical adjustment, if any (so-called "punchlist items"). Within twenty (20) days after the Sublease Commencement Date, Subtenant shall give written notice to Sublandlord specifying any punchlist items remaining to be completed, timely notice being of the essence hereof. Sublandlord, at its expense, shall have thirty (30) days from the date that Subtenant notifies Sublandlord of such punchlist items to complete such punchlist items. Notwithstanding the foregoing or any other provision in the Sublease or this Amendment to the contrary, Sublandlord shall guaranty, to the extent only of any warranty coverage that Sublandlord may obtain form its contractor, that Sublandlord's Work shall be free from defects in materials and labor for a period of not less than three (3) months from the Sublease Commencement Date and if there exists any such defects in Sublandlord's Work, Subtenant shall send written notice to Sublandlord specifying such defects in Sublandlord's Work not later than three (3) months after the Sublease Commencement Date, timely notice being of the essence hereof. Sublandlord shall be responsible, at its sole cost and expense, for the correction of any such defects with respect to which it received timely notice from Subtenant.

6. Use of Sublandlord's FF&E. Subtenant shall have the right to use Sublandlord's existing furniture, fixtures and equipment (the **"FF&E")** enumerated on Exhibit Band now located in the Additional Premises without charge to Subtenant. During the term of the Sublease through the Sublease Termination Date Subtenant shall keep and maintain Sublandlord's FF&E in good condition and repair, subject to reasonable wear and tear and/or damage due to fire or other casualty and any other matter that is not the responsibility of Subtenant under the Sublease. Subtenant may request that Sublandlord remove certain items of the FF&E identified by Subtenant at least 30 days prior to the Sublease Commencement Date. On or before the Sublease Termination Date Subtenant shall remove its own property from the entirety of the Sublet Premises (including the Additional Premises) and surrender the FF&E located in the Additional Premises to Sublandlord along with the Sublet Premises (including the Additional Premises).

7. Security Deposit. There shall be no increased Security Deposit for the Additional Premises, provided, however, the Sublease is hereby amended by deleting in its entirety Section 3(iii) thereof.

8. No Brokerage. Each party represents to the other that no broker participated in the negotiations leading to the consummation of this First Amendment to Sublease except Aidan Campbell of Colliers International (Sublandlord's Broker) and Abe Laifer and Benjamin Blumenthal of Noah & Co. (Subtenant's Broker) (collectively, the **"Brokers").** Each party agrees to indemnify and hold the other party harmless from and against any claim or demand of any other broker or agent who claims that he/she represented that party in this transaction. Upon complete execution of the First Amendment to Sublease and Landlord's written approval thereof, Sublandlord shall pay the commission due the Brokers according to a separate agreement. Sublandlord shall hold Subtenant harmless from and against any claim of nonpayment made by each of the aforesaid Brokers. This section shall survive the expiration or early termination of the Sublease.

9. Counterparts. Anything to the contrary set forth in the Sublease to the contrary notwithstanding, this Amendment may be executed in multiple counterpart copies and each such copy

shall be deemed an original and fully effective copy of this Amendment. Electronic signature (by .pdf, facsimile or DocuSign) shall be deemed originals and may be enforced as if an original agreement.

10. Except as otherwise expressly set forth herein, in all other respects the Sublease shall remain unmodified and shall continue in full force and effect, as amended hereby. The parties hereby ratify, confirm, and reaffirm all of the terms and conditions of the Sublease, as amended hereby.

[Signatures on following page.]

THIS FIRST AMENDMENT is executed as a sealed instrument as of the date first written above.

SUBLANDLORD:

RIEMER & BRAUNSTEIN LLP

By: /s/ Steven J. Weinstein
Name: Steven J. Weinstein
Title: Managing Partner
hereunto duly authorized

SUBTENANT:

SELLAS LIFE SCIENCES GROUP, INC.

By: /s/ Angelos M. Stergiou
Name: Angelos M. Stergiou
Title: President and Chief Executive Officer
hereunto duly authorized

EXHIBIT A

Additional Premises

[***]

EXHIBIT B

FF&E

1. 7 Times Square - Inventory List

a. Riemer & Braunstein I Sellas Life Sciences I December 1, 2021

Office 1 (Stacy Goldstein)
4 conference room chairs
1 office-desk chair
1 round conf room table
1 office desk with small file cabinet beside desk
1 cabinets above desk, attached to wall
1 bulletin board on wall

Office 2 (Richard Lefkowitz)
4 conf chairs
1 small conf table
1 desk with small file cabinet beside desk
1 Upright shelving cabinet (without files)
1 bulletin board on wall

Office 3 (Julie Sobel)
1 guest chair
1 office chair
1 office desk with small file cabinet beside desk
1 file cabinet with shelving
1 bulletin board on wall

Office 4 (blank)
1 guest chair
1 office chair
1 office desk with small file cabinet beside desk 1 file cabinet with shelving
1 bulletin board on wall

Office 5 (blank)
1 office chair
1 office desk with small file cabinet beside desk 1 file cabinet with shelving
1 bulletin board on wall

Kitchen
1 Keurig
1 Microwave
1 Refrigerator
1 Dishwasher

Open space
1 chair
1 conf table with 5 chairs

IT room
5 large file cabinets

Exhibit 21.1

SELLAS Life Sciences Group, Inc.

The following is a list of subsidiaries of the Company as of December 31, 2021.

SUBSIDIARY (Name under which subsidiary does business)	**STATE OF INCORPORATION OR OTHER JURISDICTION OF ORGANIZATION**
Sellas Life Sciences Limited	Ireland
Sellas Life Sciences Group Ltd.	Bermuda
SLSG Limited LLC	Delaware
Apthera, Inc.	Delaware

Exhibit 23.1

CONSENT OF INDEPENDENT REGISTERED PUBLIC ACCOUNTING FIRM

We consent to the incorporation by reference in the Registration Statements on Form S-1 (Nos. 333-225140, 333-231723, and 333-238799), Form S-3 (Nos. 333-213908, 333-224845, 333-226251, 333-233869, 333-246333, and 333-255318) and Form S-8 (Nos. 333-174819, 333-182578, 333-210833, 333-213248, 333-230741, 333-237168 and 333-258799) of our report dated March 31, 2022, relating to the consolidated financial statements of SELLAS Life Sciences Group, Inc., which report expresses an unqualified opinion and includes an explanatory paragraph relating to a going concern emphasis, appearing in this Annual Report (Form 10-K) for the year ended December 31, 2021.

/s/ Moss Adams LLP

San Francisco, California
March 31, 2022

Exhibit 31.1

CERTIFICATION OF PRINCIPAL EXECUTIVE OFFICER
PURSUANT TO SECTION 302 OF THE SARBANES-OXLEY ACT OF 2002

I, Angelos M. Stergiou, certify that:

1. I have reviewed this Annual Report on Form 10-K of SELLAS Life Sciences Group, 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 reporting, or caused such internal control over financial reporting to be designed under our supervision, to provide reasonable assurance regarding the reliability of financial reporting and the preparation of financial statements for external purposes in accordance with generally accepted accounting principles;

c) Evaluated the effectiveness of the registrant’s disclosure controls and procedures and presented in this report our conclusions about the effectiveness of the disclosure controls and procedures, as of the end of the period covered by this report based on such evaluation; and

d) Disclosed in this report any change in the registrant’s internal control over financial reporting that occurred during the registrant’s most recent fiscal quarter (the registrant's fourth fiscal quarter in the case of an annual report) that has materially affected, or is reasonably likely to materially affect, the registrant’s internal control over financial reporting; and

5. The registrant's other certifying officer 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.

Dated: March 31, 2022

/s/ Angelos M. Stergiou

Angelos M. Stergious, MD, ScD h.c.
President and Chief Executive Officer
(Principal Executive Officer and Principal Financial Officer)

Exhibit 31.2

CERTIFICATION OF PRINCIPAL FINANCIAL OFFICER
PURSUANT TO SECTION 302 OF THE SARBANES-OXLEY ACT OF 2002

I, Angelos M. Stergiou, certify that:

1. I have reviewed this Annual Report on Form 10-K of SELLAS Life Sciences Group, 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 reporting, or caused such internal control over financial reporting to be designed under our supervision, to provide reasonable assurance regarding the reliability of financial reporting and the preparation of financial statements for external purposes in accordance with generally accepted accounting principles;

c) Evaluated the effectiveness of the registrant’s disclosure controls and procedures and presented in this report our conclusions about the effectiveness of the disclosure controls and procedures, as of the end of the period covered by this report based on such evaluation; and

d) Disclosed in this report any change in the registrant’s internal control over financial reporting that occurred during the registrant’s most recent fiscal quarter (the registrant's fourth fiscal quarter in the case of an annual report) that has materially affected, or is reasonably likely to materially affect, the registrant’s internal control over financial reporting; and

5. The registrant's other certifying officer 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.

Dated: March 31, 2022

/s/ Angelos M. Stergiou

Angelos M. Stergious, MD, ScD h.c.
President and Chief Executive Officer
(Principal Executive Officer and Principal Financial Officer)

Exhibit 32.1

CERTIFICATION PURSUANT TO
18 U.S.C. SECTION 1350
AS ADOPTED PURSUANT TO
SECTION 906 OF THE SARBANES-OXLEY ACT OF 2002

In connection with the accompanying Annual Report of SELLAS Life Sciences Group, Inc., (the "Company") on Form 10-K for the year ended December 31, 2021 as filed with the Securities and Exchange Commission on the date hereof (the "Report"), the undersigned officer of the Company certifies, pursuant to 18 U.S.C. § 1350, as adopted pursuant to § 906 of the Sarbanes-Oxley Act of 2002, that to his knowledge:

1. The Report fully complies with the requirements of Section 13(a) or 15(d) of the Securities Exchange Act of 1934; and

2. The information contained in the Report fairly presents, in all material respects, the Company's financial condition and results of operations.

By: */s/ Angelos M. Stergiou*

Angelos M. Stergiou, MD, ScD h.c.
President and Chief Executive Officer
(Principal Executive Officer and Principal Financial Officer)

Date: March 31, 2022

A signed original of this written statement required by Rule 13a-14(b) of the Securities Exchange Act of 1934, as amended, and 18 U.S.C. Section 1350 has been provided to the Registrant and will be retained by the Registrant and furnished to the Securities and Exchange Commission or its staff upon request.

This certification accompanies the Form 10-K to which it relates, is not deemed filed with the Securities and Exchange Commission and is not to be incorporated by reference into any filing of the Registrant under the Securities Act of 1933, as amended, or the Securities Exchange Act of 1934, as amended, (whether made before or after the date of the Report), irrespective of any general incorporation language contained in such filing.