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Common Stock, \$.01 Par Value The NASDAQ Capital Market
(Title of each class) (Name of each exchange on which registered)

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

None

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

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

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

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

Indicate by check mark if disclosure of delinquent filers pursuant to Item 405 of Regulation S-K (§229.405 of this chapter) is not contained herein, and will not be contained, to the best of registrant's knowledge, in definitive proxy or information statements incorporated by reference in Part III of this Form 10-K or any amendment to this Form 10-K.

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 is a shell company (as defined in Rule 12b-2 of the Exchange Act). Yes No

The aggregate market value of voting stock held by non-affiliates of the registrant as of June 29, 2018 (the last trading day of the registrant's second fiscal quarter of 2018) was: \$194.0 million. There were 134,205,374 shares of the registrant's Common Stock outstanding as of March 11, 2019.

DOCUMENTS INCORPORATED BY REFERENCE

Portions of the Registrant's Definitive Proxy Statement relating to the 2019 Annual Meeting of Stockholders, which the registrant intends to file with the Securities and Exchange Commission pursuant to Regulation 14A within 120 days after the end of the registrant's fiscal year ended December 31, 2018, are incorporated by reference into Part III of this Report.

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Note Regarding Forward-Looking Statements

This Annual Report on Form 10-K and other written and oral statements the Company makes from time to time contain forward-looking statements. You can identify these forward-looking statements by the fact they use words such as “could,” “expect,” “anticipate,” “estimate,” “target,” “may,” “project,” “guidance,” “intend,” “plan,” “believe,” “will,” “opportunity,” “future” and other words and terms of similar meaning. Forward-looking statements include discussion of future operating or financial performance. You also can identify forward-looking statements by the fact that they do not relate strictly to historical or current facts. Forward-looking statements involve risks and uncertainties that could delay, divert or change any of them, and could cause actual outcomes to differ materially. These statements relate to, among other things, our business strategy, our research and development, our product development efforts, our ability to commercialize our product candidates, the activities of our licensees, our prospects for initiating partnerships or collaborations, the timing of the introduction of products, the effect of new accounting pronouncements, our future operating results and our potential profitability, availability of additional capital as well as our plans, objectives, expectations, and intentions.

Although we believe we have been prudent in our plans and assumptions, no assurance can be given that any goal or plan set forth in forward-looking statements can be achieved, and readers are cautioned not to place undue reliance on such statements, which speak only as of the date of this report. We undertake no obligation to release publicly any revisions to forward-looking statements as a result of new information, future events or otherwise.

The risks identified in this Annual Report on Form 10-K, including, without limitation, the risks set forth in Part I-Item 1A. “Risk Factors,” could cause actual results to differ materially from forward-looking statements contained in this Annual Report on Form 10-K. We encourage you to read those descriptions carefully. Such statements should be evaluated in light of all the information contained in this document.

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PART I

Item 1. Business

Our Business

We are a clinical-stage immuno-oncology (“I-O”) company with a pipeline of immune modulating antibodies, cancer vaccines, adjuvants and adoptive cell therapies - dedicated to becoming a leader in the discovery and development of innovative combination therapies and committed to bringing effective medicines to patients with cancer. Our business is designed to drive success in I-O through speed, innovation and effective combination therapies. We believe that combination therapies and a deep understanding of each patient’s cancer will drive substantial expansion of the patient population benefiting from current I-O therapies. In addition to a diverse pipeline, we have assembled fully integrated end-to-end capabilities including novel target discovery, antibody generation, cell line development and good manufacturing practice (“GMP”) manufacturing. We believe that these fully integrated capabilities enable us to produce novel candidates on timelines that are shorter than the industry standard. Leveraging from our science and capabilities, we have forged important partnerships to advance our innovation.

We believe the next generation of cancer treatment will build on clinically validated antibodies targeting CTLA-4 and PD-1 combined with novel immunomodulatory agents designed to address underlying tumor immune-escape mechanisms.

Our immunotherapy pipeline features vaccines, adjuvants, immunomodulatory and tumor microenvironment modifying antibodies, including our proprietary lead antibodies, AGEN1884 (an anti-CTLA-4 of the same IgG1 subclass as Yervoy®), and AGEN2034 (an anti-PD-1 antibody). These proprietary antibodies bind to validated targets—CTLA-4 and PD-1—and are our most advanced clinical stage combination agents with registrational potential in cervical cancer. We are aiming to develop, register and launch these products with a first potential biologics license application (“BLA”) filing as early as 2020 for both AGEN2034 monotherapy and combination therapy with AGEN1884 in second line cervical cancer. The overall strength of our pipeline, which includes potential first-in-class and best-in-class assets, is expected to drive our ability to meet individual patients’ needs.

In addition to our lead programs, Agenus scientists have leveraged our internal discovery and translational platforms and powerful algorithms to develop a pipeline of molecules that are intended to address key aspects of antitumor immunity and tumor resistance mechanism. For tumors not yet visible to the immune system, we are leveraging our immune educating neoantigen vaccine platform, designed to target mutationally based and biochemically based (phosphorylated) neoantigens (AutoSynVax and PhosphoSynVax) to prime the immune system to attack tumors. These vaccines may be applicable for patients where checkpoint modulating (“CPM”) antibodies alone are not sufficient to bring about tumor control. To further improve patient response rates, Agenus scientists are developing therapies intended to address mechanisms of immune evasion and therapeutic resistance. These include “multi-specific” antibodies that are designed to condition the tumor microenvironment and augment the activity of immune cells. We and our partners are on track to begin clinical trials with these assets in 2019. With this diverse pipeline, we are positioned to potentially deliver combination therapies with the goal to enhance response rates and benefit patients who are unresponsive to current immunotherapies.

In 2017, we formed a subsidiary, AgenTus Therapeutics, to bring innovative living drugs to cancer patients. AgenTus’ pipeline includes T cell receptors (TCR) and chimeric antigen receptors (CAR) formulated in both autologous and allogeneic cell formats. We anticipate filing our first cell therapy IND through AgenTus and advancing our differentiated allogeneic cell format towards an IND in 2019.

To succeed in I-O, innovation and speed are paramount. We are a vertically integrated biotechnology company equipped with a suite of technology platforms to advance from novel target identification (Retrocyte Display, SECANT, Agenus Immunogenic Platform (“AIM”), functional genomics and ligandomics) through manufacturing for clinical trials of antibodies and vaccines.

Our common stock is currently listed on The Nasdaq Capital Market under the symbol “AGEN.”

Our Vision

We believe that combination therapies and a deep understanding of each patient’s cancer will be key drivers of success in substantially expanding the patient population benefiting from current I-O therapies. In addition, delivering innovation with speed is critical for our future success, as drug development timelines in oncology shorten while product obsolescence rates climb. We believe our fully integrated, end-to-end capabilities from novel target discovery, antibody generation, cell line development, to GMP manufacturing, together with a comprehensive portfolio consisting of antibody-based therapeutics, adjuvants and cancer vaccines, will uniquely position us to produce novel therapies on accelerated timelines. We believe that a balanced pipeline of product candidates should focus on both validated targets as well as novel targets designed to address tumor escape mechanisms. CTLA-4 and PD-1 antagonists are recognized as the first clinically validated immunotherapy combination. These, in combination with innovative immunomodulatory antibodies or immune education vaccines, could be a focal point of the next generation of I-O combinations. Therefore, we plan to develop, register and launch our proprietary antibodies targeting PD-1 and CTLA-4 aggressively through the clinic and expand with novel combination therapies designed to improve clinical response and the durability of response of existing therapies.

Our Strategy

Our strategy is to bring innovative combination therapies for cancer patients to substantially expand the patient population benefiting from current I-O therapies. Our diverse pipeline of antibodies, vaccines and adjuvants enable us to pursue optimal combinations for optimal efficacy. We are pursuing a tiered risk profile and targeting compressed timelines for regulatory filings. In 2018, we met with the FDA and expect that each of our lead anti-CTLA-4 (AGEN1884) and anti-PD-1 (AGEN2034) trials are designed to support a BLA filing in second-line cervical cancer as early as 2020. We believe that we are positioned to take advantage of accelerated pathways for approval with a relatively small number of patients and surrogate or short-term endpoints in our trials. In addition, we plan to pursue select indications to further expedite market entry.

Our strategy for our more novel, earlier stage programs include (i) pursuit of effective I-O antibody, vaccine and cell-therapy combinations with CTLA-4 and/or PD-1 targeted antibodies as the backbone and (ii) advancement of our differentiated antibody programs such as our bispecific programs, a next generation anti-CTLA-4, and differentiated CD137 and TIGIT antibodies.

Part of our strategy is to develop and commercialize some of our product candidates by continuing our existing arrangements with collaborators and licensees and by entering into new collaborations. We are also pursuing novel financial mechanisms to support programs such as AGEN2034, including our recently announced launch of Biotech Electronic Security Tokens (BEST). See “Risk Factors—Risks Relating to Our Tokens.”

Our Assets

Our I-O assets include antibody-based therapeutics, cancer vaccine platforms and adjuvants. Our proprietary CTLA-4 and PD-1 antagonists are in clinical development; we are one of only a few companies to have proprietary anti-CTLA-4 and anti-PD-1 antibodies in clinical combinations.

To complement our portfolio of foundational CPMs, we and our partners have pre-clinical antibodies targeting tumor escape mechanisms and therapeutic resistance. These include potential best-in-class and first-in-class assets such as our next-generation anti-CTLA-4 (AGEN1181) and TIGIT (AGEN1307), as well as CD137 (AGEN2373) and bispecific antibodies that are partnered with Gilead.

Further, our neoantigen vaccine platforms include: (i) Individualized AutoSynVax™ (ASV™), which targets the unique antigens expressed by a patient’s own tumor, and (ii) off-the-shelf (or pre-manufactured) PhosphoSynVax™ (PSV™), which targets antigens expressed across patients and tumors, thereby seeking to treat broader categories of patients. Our vaccines are powered by our proprietary adjuvant, QS-21 Stimulon®. We plan to evaluate ASV in combination with checkpoint antibodies in 2019 and we are advancing preclinical development of PSV.

Our proprietary QS-21 Stimulon® is believed to be one of the most potent adjuvants known. QS-21 Stimulon® is a key component in several GSK vaccines, including GSK’s Shingrix, which has demonstrated greater than 90% efficacy, as well as the first ever malaria vaccine, Mosquirix®. Shingrix sales are substantially ahead of forecasts, making additional milestones from our royalty transaction with HCR much more likely. QS-21 is being used in numerous other clinical-stage vaccines, including our own cancer vaccines. Recently, the Bill & Melinda Gates Foundation awarded us a grant to develop an alternative, plant cell culture-based manufacturing process to ensure the continuous future supply of QS-21 Stimulon® adjuvant.

Our Antibody Discovery Platforms and CPM Programs

Checkpoint antibodies regulate immune response against pathogens that invade the body and are achieving positive outcomes in a number of cancers that were untreatable only a few years ago. Two classes of checkpoint targets include:

1. inhibitory checkpoints that help suppress an immune response in order to prevent excessive immune reaction resulting in undesired inflammation and/or auto-immunity, and
2. stimulatory checkpoints that can enhance or amplify an antigen-specific immune response.

We possess a suite of antibody discovery platforms that are designed to drive the discovery of future CPM antibody candidates. We are planning to employ a variety of techniques to identify and optimize mono-specific and multi-specific antibody candidates, internally.

Our anti-CTLA-4 and anti-PD-1 programs (AGEN1884 and AGEN2034, respectively) are in clinical trials that included a Phase 1 dose escalation with expansion cohorts in multiple solid tumors. These molecules are now in expansion trials with both anti-PD-1 monotherapy and anti-PD-1 and anti-CTLA-4 combination trials for patients with second-line cervical cancer that are designed to support one or more BLA filings as soon as 2020. In 2018, we presented data on our AGEN1884 and AGEN2034 programs at major oncology conferences, including the American Society of Clinical Oncology (“ASCO”) conference in June 2018 and the European Society for Medical Oncology (ESMO) congress in October 2018. In addition, we presented pre-clinical data on our Gilead-partnered anti-CD137 (AGEN2373), and our Incyte-partnered programs anti-TIM-3 and anti-LAG-3 antibodies at the American Association for Cancer Research (“AACR”) conference in April 2018 and the Society for Immunotherapy of Cancer (“SITC”) conference in November 2018. Our early clinical data demonstrated a clinical benefit (i.e., complete response, partial response or disease

stabilization) in more than 60% of patients treated with AGEN1884 and AGEN2034.

As of our latest data update in the fourth quarter of 2018, we have reported the following:

• We treated more than 140 patients with AGEN1884 and/or AGEN2034 and observed clinical benefit in more than 60% of them

• In our AGEN2034 (anti-PD-1) monotherapy trial, 68% of evaluable patients with metastatic and/or locally advanced solid tumors experienced clinical benefit. We presented data showing that:

o Among 38 subjects from Phase 1 of the study, three patients displayed partial response to therapy (i.e., tumors shrunk) and 23 patients displayed stable disease (i.e., tumor size was unchanged) during the follow-up period (median of 191 days or 27 weeks).

o In the ongoing Phase 2 expansion portion of this study (NCT03104699) in advanced refractory cervical cancer, three out of seven (43%) of evaluable patients experienced a clinical benefit as of July 2018. Data continues to accumulate.

o AGEN2034 appeared to be clinically active and well-tolerated.

• In our AGEN2034 (anti-PD-1) plus AGEN1884 (anti-CTLA-4) combination trial, 63% of patients with ovarian, breast, and soft tissue sarcomas showed clinical benefit, including an objective durable response in a patient with ovarian cancer.

With respect to our novel discovery pipeline, our most advanced asset is our next generation anti-CTLA-4 antibody, an IgG1 anti-CTLA-4 antagonist. Based on preclinical data, we believe that this molecule has potential advantages over competing anti-CTLA-4 molecules, including:

- (1) potential to induce enhanced T cell priming via the engineered Fc region, as T cell priming is a crucial step in generating potent immune responses against cancer,
- (2) increased potential to deplete intratumoral regulatory T cells, which represent a significant barrier to successful anti-cancer immune responses,
- (3) better combination potential with other antitumor or immunomodulatory antibodies, vaccines, and targeted therapies and
- (4) potential therapeutic benefit to a wider patient population, including the estimated 40% of patients who are unlikely to fully benefit from the first generation CTLA-4 therapies due to a genetic predisposition.

We filed an IND for AGEN1181 in the fourth quarter of 2018 and expect to initiate clinical trials in 2019.

Partnered CPM Programs

In December 2018, we entered into a series of agreements with Gilead Sciences, Inc. (“Gilead”) to collaborate on the development and commercialization of up to five novel I-O therapies. Pursuant to the collaboration agreements, we received an upfront cash payment from Gilead of \$120.0 million following the closing in January 2019 and are eligible to receive up to an additional \$1.7 billion in aggregate potential fees and milestones. At closing, Gilead received worldwide exclusive rights to our bispecific antibody, AGEN1423. Gilead also received the exclusive option to license exclusively AGEN1223, a bispecific antibody, and AGEN2373, a monospecific antibody. We recently filed INDs for AGEN1423 and AGEN1223 and are planning to file an IND for AGEN2373 in the first half of 2019. We are responsible for developing the option programs up to the option decision points, at which time Gilead may acquire exclusive rights to the programs on option exercise. For either, but not both, of the option programs, we have the right to opt-in to share Gilead’s development and commercialization costs in the United States in exchange for a profit (loss) share on a 50:50 basis and revised milestone payments. Gilead also received the right of first negotiation for two additional, undisclosed preclinical programs. At the closing, Gilead also purchased 11,111,111 shares of Agenus common stock for \$30.0 million pursuant to a stock purchase agreement.

In January 2015, we entered into a collaboration with Incyte Corporation (“Incyte”) to discover, develop and commercialize novel immuno-therapeutics using our antibody platforms. The collaboration was initially focused on four CPM programs targeting GITR, OX40, TIM-3 and LAG-3, and in November 2015, we expanded the alliance by adding three novel undisclosed CPM targets. Pursuant to the terms of the original agreement, Incyte paid us \$25.0 million in upfront cash. Targets under the collaboration were designated as either profit-share programs, where the parties shared all costs and profits equally, or royalty-bearing programs, where Incyte funded all costs, and we were eligible to receive milestones and royalties. Under the original collaboration agreement, programs targeting GITR, OX40 and two of the undisclosed targets were designated as profit-share programs, while the other targets were royalty-bearing programs. For each profit-share product, we were eligible to receive up to \$20.0 million in future contingent development milestones. For each royalty-bearing product, we were eligible to receive (i) up to \$155.0 million in future contingent development, regulatory, and commercialization milestones and (ii) tiered royalties on global net sales at rates generally ranging from 6%-12%. Concurrent with the execution of the original collaboration agreement, we and Incyte also entered into a stock purchase agreement pursuant to which Incyte purchased approximately 7.76 million shares of our common stock for an aggregate purchase price of \$35.0 million. In February 2017, we and Incyte amended the terms of the original collaboration agreement to, among other things, convert the GITR and OX40 programs from profit-share to royalty-bearing programs with royalties on global net sales at a flat

15% rate for each. In addition, the profit-share programs relating to two undisclosed targets were removed from the collaboration, with one reverting to Incyte and one to Agenus (the latter being our TIGIT antibody program), each with royalties on global net sales at a flat 15% rate. The remaining three royalty-bearing programs in the collaboration targeting TIM-3, LAG-3 and one undisclosed target remain unchanged, and there are no more profit-share programs under the collaboration. Pursuant to the amended agreement, we received accelerated milestone payments of \$20.0 million from Incyte related to the clinical development of INCAGN1876 (anti-GITR agonist) and INCAGN1949 (anti-OX40 agonist). Concurrent with the execution of the amendment agreement, we and Incyte entered into a separate stock purchase agreement whereby Incyte purchased an additional 10 million shares of our common stock for an aggregate purchase price of \$60.0 million. Incyte advanced both INCAGN1876 (anti-GITR agonist) and INCAGN1949 (anti-OX40 agonist) into the clinic in 2016. INCAGN1876 is currently in a Phase 1/2 trial exploring its safety, tolerability, and efficacy in combination with immune therapies, ipilimumab and nivolumab, in advanced or metastatic malignancies such as advanced or metastatic endometrial cancer, gastric cancer (including stomach, esophageal, and gastroesophageal junction), and squamous cell carcinoma of the head and neck. INCAGN1949 is currently in a Phase 1/2 trial exploring its safety, tolerability, and efficacy in combination with immune therapies, ipilimumab and nivolumab, in advanced or metastatic malignancies such as advanced or metastatic urothelial carcinoma or RCC. In 2018, Incyte initiated clinical trials for their INCAGN2385 (LAG-3) and INCAGN2390 (TIM-3) programs.

In April 2014, we entered into a collaboration and license agreement with Merck to discover and optimize fully-human antibodies against two undisclosed CPM targets. In 2016, Merck selected a lead product candidate against one of the undisclosed targets to advance into preclinical studies, and subsequently initiated a Phase 1 clinical trial with the undisclosed antibody in August 2018. Under the terms of the agreement, Merck is responsible for all future product development expenses for the selected antibody candidate, and Agenus is eligible to receive up to \$95.0 million in potential milestones plus royalties on any future sales.

On September 20, 2018, we, through our wholly-owned subsidiary, Agenus Royalty Fund, LLC, entered into a Royalty Purchase Agreement (the "XOMA Royalty Purchase Agreement") with XOMA (US) LLC ("XOMA US"). Pursuant to the terms of the XOMA Royalty Purchase Agreement, XOMA US paid us \$15.0 million at closing in exchange for the right to receive 33% of the future royalties and 10% of the future milestones that we are entitled to receive from Incyte and Merck, net of certain of our obligations to a third party and excluding the milestone we received from Incyte in the fourth quarter of 2018. After taking into account our obligations under the XOMA Royalty Purchase Agreement, as of December 31, 2018, we remain eligible to receive up to \$450.0 million and \$85.5 million in potential development, regulatory and commercial milestones from Incyte and Merck, respectively.

We also have a collaboration agreement with Recepta Biopharma SA for the development of our antibodies targeting CTLA-4 and PD-1, which gives Recepta certain rights to South American countries. We expect to continue exploring additional future collaborations.

Vaccine Platforms

Our current vaccine platforms for the treatment of cancer, and potentially other indications, include our HSP based Prophage vaccine candidates, and our fully synthetic, neoantigen vaccine candidates, ASV and PSV.

HSPs are a group of proteins present at high levels in most mammalian cells. Their expression is increased when cells are exposed to elevated temperatures or other stresses. A potential role for HSPs in regulating immune responses was revealed when it was first discovered that HSP complexes purified from cancer cells produced immunity to cancer, whereas HSP complexes purified from normal tissue did not. This discovery led to the understanding that HSPs bind to and carry a broad sampling of the protein environment within cells, including mutant proteins that might arise from genetic mutations within cancer cells. It was further shown that immunization with HSP complexes purified from tumors generate both CD4 and CD8 positive T-cell immune responses. These activated T-cells target the cancer cells of the tumor, from which the HSP complexes were derived, for destruction. Thus, HSP complexes isolated from

cancer cells may be particularly helpful in mediating successful immunization. Since HSPs are expressed in all tumor cells, the approach of immunizing with the HSP complexes isolated from a particular tumor may be broadly applicable to a variety of cancer types. We believe that we pioneered the use of gp96, an HSP, purified from a patient's own tumor tissue, as a way to make I-O vaccine candidates.

Prophage Vaccine Candidates

Our early vaccine technology, Prophage (HSPPC-96), is an autologous cancer vaccine therapy derived from cancer tissues that are surgically removed from an individual patient designed to contain a broad sampling of potentially antigenic mutant proteins to educate the patient's immune system to seek out and destroy cancer. To date, more than 1,000 patients have been treated with Prophage. Data reported at ASCO in 2015 demonstrated that patients with newly diagnosed GBM (ndGBM) with lower immune suppression (measured by peripheral PD-L1 expression) had an improved response to vaccine. To further explore these findings, we announced a Phase 2 clinical trial collaboration with the National Cancer Institute ("NCI") to evaluate Prophage in combination with pembrolizumab (Keytruda®). The trial is being conducted by the Brain Tumor Trials Collaborative ("BTTC"), led by Dr. Mark Gilbert, Chief of the Neuro-Oncology Branch at the NCI Center for Cancer Research with product provided by Agenus and Merck. The trial is ongoing.

Neoantigen Vaccine Platforms

Our neoantigen vaccine platforms include: (i) individualized AutoSynVax™ (ASV™), which targets the unique antigens expressed by a patient's own tumor, and (ii) off-the-shelf (or pre-manufactured) PhosphoSynVax™ (PSV™), which targets antigens expressed across patients and tumors, potentially enabling us to treat broader categories of patients.

Our neoantigen vaccines are designed with unique features, intending to confer important advantages: (1) proprietary methods to develop an effective and relevant "Blueprint" of immunogenic neoantigens for each patient; (2) HSPs to efficiently deliver neoantigens to the right immune cells to activate an anti-cancer immune response. Our proprietary linker technology is designed to enable efficient neoantigen loading for a robust cancer specific immune response with significantly less peptide; and (3) QS-21 Stimulon® adjuvant, a potent immune stimulator now in GSK's commercial shingles vaccine, Shingrix.

Mutation-based neo-epitopes, which will form the basis for the immunogens used in ASV, appear to be almost always particular to a given patient. Therefore, ASV is a largely individualized vaccine product candidate. With a small amount of a patient's tumor as a sample, our ASV program is designed to utilize next generation sequencing technologies coupled with complex bioinformatics algorithms to identify mutations in a tumor's DNA and RNA. Once these mutations have been identified, we plan to manufacture synthetic peptides encoding these neoepitopes, load these peptides on to our recombinant HSP70 and deliver a fully synthetic polyvalent vaccine to the patient. This program is based on the hypothesis that the HSP70 platform would shuttle the mutated peptides to sites where they could be recognized by the immune system and elicit a cytotoxic and helper T cell response in patients with cancer.

Biochemically based neoantigens, such as those arising from dysregulated phosphorylation of various proteins in malignant cells, can serve as a tumor fingerprint across a broad histology of tumors. Through our acquisition of PhosImmune, we have a portfolio of proprietary phosphorylated antigenic targets that can be used for therapeutic development. PSV is a vaccine candidate designed to induce immunity against this novel class of tumor specific neoepitopes known as Phosphopeptides ("PTTs"). PSV is intended to induce cellular immunity to abnormal phosphopeptide neoepitopes that are characteristic of these various forms of cancer. We believe PTTs are among the most promising candidates for anti-cancer immunity, as patients with PTT immunity have been shown to have better outcomes than those without PTT immunity. We have amassed a proprietary library of more than 2,000 PTTs. Many of these PTTs are shared among many cancer patients and across multiple tumor types. We are using these PTTs for developing multiple off-the-shelf vaccines. PSV is based on our vaccine platform and includes our proprietary QS-21 Stimulon adjuvant and heat-shock protein backbone. We are developing multiple indication-specific PSV offerings, with lead programs in acute myeloid leukemia (AML) and colorectal cancer (CRC). By leveraging our proprietary vaccine platform which has already demonstrated clinical safety and immunogenicity, we intend to advance at least one PSV formulation into the clinic in 2019.

QS-21 Stimulon Adjuvant

QS-21 Stimulon is an adjuvant, which is a substance added to a vaccine or other immunotherapy that is intended to enhance an immune response to the target antigens. QS-21 Stimulon is a natural product, a triterpene glycoside, or saponin, purified from the bark of the Chilean soapbark tree, *Quillaja saponaria*. QS-21 Stimulon has the ability to stimulate an antibody-mediated immune response and has also been shown to activate cellular immunity. It has become a key component in the development of investigational preventive vaccine formulations across a wide variety of diseases. These studies have been carried out by academic institutions and pharmaceutical companies in the United States and internationally. A number of these studies have shown QS-21 Stimulon to be significantly more effective in stimulating immune responses than aluminum hydroxide or aluminum phosphate, the adjuvants most commonly used in approved vaccines in the United States today. In January 2019, we announced that the Bill & Melinda Gates Foundation awarded us a grant to develop an alternative, plant cell culture-based manufacturing process to ensure the continuous future supply of QS-21 Stimulon adjuvant.

Partnered QS-21 Stimulon Programs

In 2006, we entered into a license agreement and a supply agreement with GSK for the use of QS-21 Stimulon (the “GSK License Agreement” and the “GSK Supply Agreement,” respectively). In 2009, we entered into an Amended and Restated Manufacturing Technology Transfer and Supply Agreement (the “Amended GSK Supply Agreement”) under which GSK has the right to manufacture all of its requirements of commercial grade QS-21 Stimulon. GSK is obligated to supply us, or our affiliates, licensees, or customers, certain quantities of commercial grade QS-21 Stimulon for a stated period of time. In March 2012, we entered into a First Right to Negotiate and Amendment Agreement amending the GSK License Agreement and the Amended GSK Supply Agreement to clarify and include additional rights for the use of QS-21 Stimulon (the “GSK First Right to Negotiate Agreement”). In addition, we granted GSK the first right to negotiate for the purchase of Agenus or certain of our assets, which expired in March 2017. As consideration for entering into the GSK First Right to Negotiate Agreement, GSK paid us an upfront cash payment of \$9.0 million, \$2.5 million of which was creditable toward future royalty payments. We refer to the GSK License Agreement, the Amended GSK Supply Agreement and the GSK First Right to Negotiate Agreement collectively as the GSK Agreements. In 2017, we received a final milestone payment of \$1.0 million from GSK and are no longer entitled to any additional milestone payments under the GSK Agreements. Under the terms of the Agreement, we are generally entitled to receive a 2% royalty on net sales of prophylactic vaccines for a period of 10 years after the first commercial sale of a resulting GSK product, which was triggered with GSK’s first commercial sale of Shingrix in 2017. Notably, we have already monetized and sold this entire royalty stream as discussed in more detail below.

The GSK License and Amended GSK Supply Agreements may be terminated by either party upon a material breach if the breach is not cured within the time specified in the respective agreement. The termination or expiration of the GSK License Agreement does not relieve either party from any obligation which accrued prior to the termination or expiration. Among other provisions, the license rights granted to GSK survive expiration of the GSK License Agreement. The license rights and payment obligations of GSK under the Amended GSK Supply Agreement survive termination or expiration, except that GSK's license rights and future royalty obligations do not survive if we terminate due to GSK's material breach unless we elect otherwise. We do not incur clinical development costs for products partnered with GSK.

In September 2015, we monetized a portion of the royalties associated with the GSK License Agreement to an investor group led by Oberland Capital Management for up to \$115.0 million in the form of a non-dilutive royalty transaction. Under the terms of a note purchase agreement with the investor group (the "Note Purchase Agreement"), we received \$100.0 million at closing for which the investors had the right to receive 100% of our worldwide royalties under the GSK License Agreement on sales of GSK's Shingrix and malaria (RTS,S) prophylactic vaccine products that contain our QS-21 Stimulon adjuvant to pay down principle and interest. In November 2017, and pursuant to the Note Purchase Agreement, we received an additional \$15.0 million in cash from the investors based on the approval of Shingrix by the FDA. Pursuant to the terms of this transaction, we retained the right to receive all royalties from GSK after all principal, interest and other obligations were satisfied under the Note Purchase Agreement. The Note Purchase Agreement also allowed us to buy back the loan and extinguish the notes early under pre-specified terms, which we did in January 2018.

In January 2018, we sold 100% of all royalties we were entitled to receive from GSK to Healthcare Royalty Partners III, L.P. and certain of its affiliates (collectively, "HCR") and used the proceeds to extinguish the debt under the Note Purchase Agreement. HCR paid approximately \$190.0 million at closing for the royalty rights, of which approximately \$161.9 was used to extinguish the prior notes, yielding us approximately \$28.0 million in net proceeds. We are also entitled to receive up to \$40.35 million in milestone payments from HCR based on sales of GSK's vaccines as follows: (i) \$15.1 million upon reaching \$2.0 billion last-twelve-months net sales any time prior to 2024 and (ii) \$25.25 million upon reaching \$2.75 billion last-twelve-months net sales any time prior to 2026. We would owe a reverse milestone payment of approximately \$25.9 million to HCR in 2021 if neither of the following sales milestones are achieved: (i) 2019 sales of the GSK vaccines exceed \$1.0 billion or (ii) 2020 sales of the GSK vaccines exceed \$1.75 billion (the "Rebate Payment"). As part of the transaction, we provided a guaranty for the potential Rebate Payment and secured the obligation with substantially all of our assets pursuant to a security agreement, subject to certain customary exceptions and excluding all assets necessary for AgenTus Therapeutics, Inc. In February 2019, GSK reported that Shingrix sales for 2018, its first full year on the market, were over \$1.0 billion.

Manufacturing

Manufacturing CPM Antibodies

In December 2015, we acquired an antibody manufacturing pilot plant in Berkeley, CA from XOMA Corporation ("XOMA"), which we refer to as "Agenus West." A team of former XOMA employees with valuable chemistry, manufacturing and controls experience joined us and continue to operate the facility. In addition, in February 2017, we amended our collaboration with Incyte, transferring manufacturing responsibilities for all antibodies under the collaboration to them. This includes antibodies targeting GITR, OX40, TIM-3, LAG-3 and one undisclosed target. We have transferred the manufacturing know how to Incyte to support these endeavors and allow Agenus to focus on the manufacture of antibodies for some of our own CPM programs and those of existing and potential third-party collaborators. Since the acquisition of Agenus West, we have made significant improvements in the plant, and added additional headcount increasing both scale and capacity. Agenus West is currently producing antibody drug substance for our lead programs. We have been able to deliver clinical grade material from research cell banks in approximately four months, which we believe to be three to four times faster than the industry average. Agenus West utilizes cutting-edge technology platforms, enabling us to be self-reliant and giving us the advantage of manufacturing speed,

cost efficiency, operational flexibility and manufacturing technology transfer to commercial scale partners—all with desired product quality, with the ultimate goal of benefiting patients.

Manufacturing Cancer Vaccines

We manufacture our cancer vaccine candidates in our Lexington, MA facility.

Each Prophage vaccine is manufactured using a patient's own tumor. After the patient undergoes surgery to remove cancerous tumor tissue, the tumor is shipped frozen in a specially designed kit provided by us to our Lexington, Massachusetts facility. The turnaround time from the date of surgery to delivery of vaccine is approximately three to four weeks, which generally fits well with the patient's recovery time from surgery.

ASV and PSV vaccine candidates are manufactured using HSP70 loaded with synthetic peptide synthesized by approved manufacturers. The sequence of the peptides is determined by sequencing and analysis of patient and tumor DNA and RNA and run through complex algorithms by our bioinformatics group who have specialized knowledge of the attributes required to elicit immune responsiveness. This process takes several weeks, after which the manufactured vaccine undergoes extensive quality testing, including sterility testing, which takes a further two weeks.

We have established, within a single facility, well-defined, cost efficient vaccine manufacturing under GMPs, including bioanalytical, quality control and quality assurance, logistics, distribution and supply chain management. After manufacturing, Prophage and ASV vaccine candidates are tested and released by our analytical and quality systems staff. The quality control organization performs a series of release assays designed to ensure that the product meets all applicable specifications. Our quality assurance staff also reviews manufacturing and quality control records prior to batch release in an effort to assure conformance with current GMP (“cGMP”) as mandated by the FDA and foreign regulatory agencies.

Our manufacturing staff is trained and routinely evaluated for conformance to rigorous manufacturing procedures and quality standards. This oversight is intended to ensure compliance with FDA and foreign regulations and to provide consistent vaccine output. Our quality control and quality assurance staff is similarly trained and evaluated as part of our effort to ensure consistency in the testing and release of the product, as well as consistency in materials, equipment and facilities.

QS-21 Stimulon

Except in the case of GSK, we have retained worldwide manufacturing rights for QS-21 Stimulon, and we have the right to subcontract manufacturing for QS-21 Stimulon. In addition, under the terms of our agreement with GSK, upon request by us, GSK is committed to supply certain quantities of commercial grade QS-21 Stimulon to us and our licensees for a fixed period of time.

Intellectual Property Portfolio

We seek to protect our technologies through a combination of patents, trade secrets and know-how, and we currently own, co-own or have exclusive rights to approximately 25 issued United States patents and approximately 75 issued foreign patents. We also own, co-own or have exclusive rights to approximately 35 pending United States patent applications and approximately 180 pending foreign patent applications. We may not have rights in all territories where we may pursue regulatory approval for our product candidates.

Through various acquisitions, we own, co-own, or have exclusive rights to a number of patents and patent applications directed to various methods and compositions, including methods for identifying therapeutic antibodies and product candidates arising out of such entities’ technology platforms. In particular, we own patents and patent applications relating to our Retrocyte Display technology platform, a high throughput antibody expression platform for the identification of fully-human and humanized monoclonal antibodies. This patent family is projected to expire between 2029 and 2031. We own, co-own, or have exclusive rights to patents and patent applications directed to various methods and compositions, including a patent directed to methods for identifying phosphorylated proteins using mass spectrometry. This patent is projected to expire in 2023. In addition, as we advance our research and development efforts with our institutional and corporate collaborators, we are seeking patent protection for certain newly identified therapeutic antibodies and product candidates. We can provide no assurance that any of our patents, including the patents that we acquired or in-licensed, will have commercial value, or that any of our existing or future patent applications, including the patent applications that were acquired or in-licensed, will result in the issuance of valid and enforceable patents. Our issued patents covering Prophage vaccine and methods of use thereof, alone or in combination with other agents, expired or will expire at various dates between 2015 and 2024. In particular, our issued U.S. patents covering Prophage composition of matter expired in 2015. In addition, our issued patents covering QS-21 Stimulon composition of matter expired in 2008. We continue to explore means of extending the life cycle of our patent portfolio.

Various patents and patent applications have been exclusively licensed to us by the following entities:

University of Virginia

In connection with our acquisition of PhosImmune in December 2015, we obtained exclusive rights to a portfolio of patent applications and one issued patent relating to PTTs under a patent license agreement with the University of Virginia (“UVA”). The UVA license gives us exclusive rights to develop and commercialize the PTT technology. Under the license agreement, we will pay low to mid-single digit running royalties on net sales of PTT products, and a modest flat percentage of sublicensing income. In addition, we may be obligated to make milestone payments of up to \$2.7 million for each indication of a licensed PTT product to complete clinical trials and achieve certain sales thresholds. The term of the UVA license agreement ends when the last of the licensed patents expires or becomes no longer valid. The UVA license agreement may be terminated as follows: (i) by UVA in connection with our bankruptcy or cessation of business relating to the licensed technology, (ii) by UVA if we commit a material, uncured breach or (iii) by us for our convenience on 180 days written notice.

Ludwig Institute for Cancer Research

On December 5, 2014, our wholly-owned subsidiary, Agenus Switzerland Inc. (formerly known as 4-Antibody AG) (“4-AB”), entered into a license agreement with the Ludwig Institute for Cancer Research Ltd. (“Ludwig”), which replaced and superseded a prior agreement entered into between the parties in May 2011. Pursuant to the terms of the license agreement, Ludwig granted 4-AB an exclusive, worldwide license under certain intellectual property rights of Ludwig and Memorial Sloan Kettering Cancer Center arising from the prior agreement to further develop and commercialize GITR, OX40 and TIM-3 antibodies. On January 25, 2016, we and 4-AB entered into a second license agreement with Ludwig, on substantially similar terms, to develop CTLA-4 and PD-1

antibodies. Pursuant to the December 2014 license agreement, 4-AB made an upfront payment of \$1.0 million to Ludwig. The December 2014 license agreement also obligates 4-AB to make potential milestone payments of up to \$20.0 million for events prior to regulatory approval of licensed GITR, OX40 and TIM-3 products, and potential milestone payments in excess of \$80.0 million if such licensed products are approved in multiple jurisdictions, in more than one indication, and certain sales milestones are achieved. Under the January 2016 license agreement, we are obligated to make potential milestone payments of up to \$12.0 million for events prior to regulatory approval of CTLA-4 and PD-1 licensed products, and potential milestone payments of up to \$32.0 million if certain sales milestones are achieved. Under each of these license agreements, we and/or 4-AB will also be obligated to pay low to mid-single digit royalties on all net sales of licensed products during the royalty period, and to pay Ludwig a percentage of any sublicensing income, ranging from a low to mid-double digit percentage depending on various factors. During the year ended December 31, 2017, we paid a percentage of sublicensing income totaling \$2.0 million to Ludwig under the license agreements. No payments were made during the year ended December 31, 2018. The license agreements may each be terminated as follows: (i) by either party if the other party commits a material, uncured breach; (ii) by either party if the other party initiates bankruptcy, liquidation or similar proceedings; or (iii) by 4-AB or us (as applicable) for convenience upon 90 days' prior written notice. The license agreements also contain customary representations and warranties, mutual indemnification, confidentiality and arbitration provisions.

University of Connecticut Health Center

In May 2001, we entered into a license agreement with the University of Connecticut Health Center ("UConn") which was amended in March 2003 and June 2009. Through the license agreement, we obtained an exclusive, worldwide license to patent rights resulting from inventions discovered under a research agreement that was effective from February 1998 until December 2006. The term of the license agreement ends when the last of the licensed patents expires in 2028 or becomes no longer valid. UConn may terminate the agreement: (1) if, after 30 days written notice for breach, we continue to fail to make any payments due under the license agreement, or (2) we cease to carry on our business related to the patent rights or if we initiate or conduct actions in order to declare bankruptcy. We may terminate the agreement upon 90 days written notice. We are required to make royalty payments on any obligations created prior to the effective date of termination of the license agreement. Upon expiration or termination of the license agreement due to breach, we have the right to continue to manufacture and sell products covered under the license agreement which are considered to be works in progress for a period of six months. The license agreement contains aggregate milestone payments of approximately \$1.2 million for each product we develop covered by the licensed patent rights. These milestone payments are contingent upon regulatory filings, regulatory approvals, and commercial sales of products. We have also agreed to pay UConn a royalty on the net sales of products covered by the license agreement as well as annual license maintenance fees beginning in May 2006. Royalties otherwise due on the net sales of products covered by the license agreement may be credited against the annual license maintenance fee obligations. Under the March 2003 amendment, we agreed to pay UConn an upfront payment and to make future payments for each patent or patent application with respect to which we exercised our option under the research agreement. As of December 31, 2018, we had paid approximately \$1.0 million to UConn under the license agreement. The license agreement gives us complete discretion over the commercialization of products covered by the licensed patent rights but also requires us to use commercially reasonable diligent efforts to introduce commercial products within and outside the United States. If we fail to meet these diligence requirements, UConn may be able to terminate the license agreement.

Regulatory Compliance

Governmental authorities in the United States and other countries extensively regulate the pre-clinical and clinical testing, manufacturing, labeling, storage, record keeping, advertising, promotion, export, marketing and distribution, among other things, of our investigational product candidates. In the United States, the FDA under the Federal Food, Drug, and Cosmetic Act, the Public Health Service Act and other federal statutes and regulations, subject pharmaceutical products to rigorous review.

In order to obtain approval of a new product from the FDA, we must, among other requirements, submit proof of safety and efficacy as well as detailed information on the manufacture and composition of the product. In most cases, this proof entails extensive pre-clinical, clinical, and laboratory tests. Before approving a new drug or marketing application, the FDA may also conduct pre-licensing inspections of the company, its contract research organizations and/or its clinical trial sites to ensure that clinical, safety, quality control, and other regulated activities are compliant with Good Clinical Practices (“GCP”), or Good Laboratory Practices (“GLP”), for specific non-clinical toxicology studies. The FDA may also require confirmatory trials, post-marketing testing, and extra surveillance to monitor the effects of approved products, or place conditions on any approvals that could restrict the commercial applications of these products. Once approved, the labeling, advertising, promotion, marketing, and distribution of a drug or biologic product must be in compliance with FDA regulatory requirements.

In Phase 1 clinical trials, the sponsor tests the product in a small number of patients or healthy volunteers, primarily for safety at one or more doses. Phase 1 trials in cancer are often conducted with patients who have end-stage or metastatic cancer. In Phase 2, in addition to safety, the sponsor evaluates the efficacy of the product in a patient population somewhat larger than Phase 1 trials. Phase 3 trials typically involve additional testing for safety and clinical efficacy in an expanded population at geographically dispersed test sites. The FDA may order the temporary or permanent discontinuation of a clinical trial at any time.

The sponsor must submit to the FDA the results of pre-clinical and clinical testing, together with, among other things, detailed information on the manufacture and composition of the product, in the form of a new drug application (“NDA”), or in the case of

biologics, a BLA. In a process that can take a year or more, the FDA reviews this application and, when and if it decides that adequate data are available to show that the new compound is both safe and effective for a particular indication and that other applicable requirements have been met, approves the drug or biologic for marketing.

Whether or not we have obtained FDA approval, we must generally obtain approval of a product by comparable regulatory authorities of international jurisdictions prior to the commencement of marketing the product in those jurisdictions. We are also subject to cGMP, GCP, and GLP compliance obligations and are subject to inspection by international regulatory authorities. International requirements may in some circumstances be more rigorous than U.S. requirements and may require additional investment in manufacturing process development, non-clinical studies, clinical studies, and record-keeping that are not required for U.S. regulatory compliance or approval. The time required to obtain this approval may be longer or shorter than that required for FDA approval and can also require significant resources in time, money and labor.

Under the laws of the United States, the countries of the European Union and other nations, we and the institutions where we sponsor research are subject to obligations to ensure the protection of personal information of human subjects participating in our clinical trials. We have instituted procedures that we believe will enable us to comply with these requirements and the contractual requirements of our data sources. The laws and regulations in this area are evolving, and further regulation, if adopted, could affect the timing and the cost of future clinical development activities.

We are also subject to regulation under the Occupational Safety and Health Act, the Toxic Substances Control Act, the Resource Conservation and Recovery Act, and other current and potential future federal, state, or local regulations. Our research and development activities involve the controlled use of hazardous materials, chemicals, biological materials, various radioactive compounds, and for some experiments we use recombinant DNA. We believe that our procedures comply with the standards prescribed by local, state, and federal regulations; however, the risk of injury or accidental contamination cannot be completely eliminated. We conduct our activities in compliance with the National Institutes of Health Guidelines for Recombinant DNA Research.

Additionally, the U.S. Foreign Corrupt Practices Act (“FCPA”), prohibits U.S. corporations and their representatives from offering, promising, authorizing or making payments to any foreign government official, government staff member, political party or political candidate in an attempt to obtain or retain business abroad. The scope of the FCPA includes interactions with certain healthcare professionals in many countries. Other countries have enacted similar anti-corruption laws and/or regulations.

Competition

Competition in the pharmaceutical and biotechnology industries is intense. Many pharmaceutical or biotechnology companies have products on the market and are actively engaged in the research and development of products for the treatment of cancer.

Many competitors have substantially greater financial, manufacturing, marketing, sales, distribution, and technical resources, and more experience in research and development, clinical trials, and regulatory matters, than we do. Competing companies developing or acquiring rights to more efficacious therapeutic products for the same diseases we are targeting, or which offer significantly lower costs of treatment, could render our products noncompetitive or obsolete. See Part I-Item 1A. “Risk Factors-Risks Related to our Business-Our competitors may have superior products, manufacturing capability, selling and marketing expertise and/or financial and other resources.”

Academic institutions, governmental agencies, and other public and private research institutions conduct significant amounts of research in biotechnology, medicinal chemistry and pharmacology. These entities have become increasingly active in seeking patent protection and licensing revenues for their research results. They also compete with us in recruiting and retaining skilled scientific talent.

The CPM landscape is crowded with several competitors developing assets against a number of targets. Development plans are spread out across various indications and lines of therapy, either alone or in combination with other assets. Competitors range from small cap to large cap companies, with assets in pre-clinical or clinical stages of development. Therefore, the landscape is dynamic and constantly evolving. We and our partners have CPM antibody programs, currently in clinical stage development targeting PD-1, CTLA-4, GITR, OX40, TIM-3 and LAG-3. We are aware of many companies that have antibody-based products on the market or in clinical development that are directed to the same biological targets as these programs, including, without limitation, the following: (1) BMS markets ipilimumab, an anti-CTLA-4 antibody, and nivolumab, an anti-PD-1 antibody, and is developing additional antagonists to LAG-3 and TIM-3. BMS also has next generation anti-CTLA-4 antibodies in the clinic, which may be competitive to our next generation anti-CTLA-4 program, (2) Merck has an approved anti-PD-1 antibody, as well as anti-CTLA-4 and LAG-3 antagonists and an anti-GITR agonist in clinical development, (3) Regeneron has an approved anti-PD-1 antibody as well as antibodies targeting CTLA-4 and LAG-3 in preclinical or early clinical development, (4) AstraZeneca has an approved anti PD-L1 antibody, as well as an anti-CTLA-4 (using a different isotype, an IgG2 isotype) targeting antibody in the clinic, (5) Pfizer has an approved anti-PD-L1 (with Merck KgaA) as well as anti-PD-1, and anti-OX40 antibodies in clinical development, and (6) Roche/Genentech has an approved anti-PD-L1 antibody. Besides these PD-1 and PD-L1 antibodies that were approved in the U.S., we are also aware of competitors with approved PD-1 agents in ex-US geographies such as China. These include Innovent Biologics and Shanghai Junshi Biosciences. We are also aware of other competitors with PD-1/PD-L1 agents in clinical development, including but not limited to, AbbVie, Arcus

Biosciences, Boehringer Ingelheim, Tesaro, Beigene, Eli Lilly, Jiangsu HengRui Medicine, MacroGenics/Incyte, CytomX/BMS, Novartis, Symphogen, Jounce Therapeutics, Gilead Sciences, Janssen, CBT Pharmaceuticals/Genor Biopharma, Checkpoint Therapeutics, CStone Pharmaceuticals, Livzon MabPharm Inc, Suzhou Alphamab, Mabspace Biosciences, Henlix Biotech Inc., Akeso Biopharma and CSPC ZhongQi Pharmaceutical Technology. We are also aware of competitors with pre-clinical antibodies against PD-1 or PD-L1. In addition, we are aware of competitors with clinical stage antibodies against GITR, OX40, LAG-3, TIM-3 as well as our earlier stage programs such as TIGIT and CD137. As outlined above, some of these include, but are not limited to, BMS, Pfizer, Novartis, Merck, Tesaro, Regeneron, Eli Lilly, OncoMed, Boehringer Ingelheim, Potenza, Arcus Biosciences, GlaxoSmithKline, AbbVie, Leap Therapeutics and Symphogen. Additionally, we are aware of competitors developing preclinical assets and bispecifics against each of the above targets. There is no guarantee that our antibody product candidates will be able to compete with our competitors' antibody products and product candidates.

We are conducting both single arm and combination trials in second line cervical cancer. We are aware that Merck's PD-1 antagonist, Keytruda, has been approved in advanced cervical cancer. We are also aware of industry sponsored clinical trials, including exploratory studies that are underway in this setting. Clinical stage competitors include, but are not limited to, Regeneron (anti-PD-1), Ono Pharmaceuticals and BMS (anti-PD-1 alone or in combination with agents against other checkpoint targets), Seattle Genetics and Genmab (antibody drug conjugate targeting Tissue Factor), Iovance Biotherapeutics (autologous TILs), Genor Biopharma and Lee Pharmaceuticals. Additionally, we are aware of other early stage clinical trials testing alternate checkpoint targets in cervical cancer patients. These include, but are not limited to, OX40 +/- CD137 agonists (Pfizer) and anti-PD-1 + anti-ICOS (GSK/Merck).

We have autologous vaccine programs in development including our Prophage vaccine in clinical development for GBM. We are aware of other therapeutic options in GBM that could compete with our vaccine, including but not limited to the following: Merck markets temozolomide for treatment of patients with ndGBM and refractory astrocytoma. Other companies are developing vaccines for the treatment of patients with ndGBM, including, but not limited to Northwest Biotherapeutics (DC-Vax), Mimivax Inc. (SurVaxM) and Annias Immunotherapeutics (CMV Vaccine). Other companies may begin development programs as well. We are advancing our neoantigen vaccine, AutoSynVax, in solid tumors. There are companies advancing individualized or synthetic vaccine technologies and/or patient-specific medicine techniques that compete with our HSP based vaccines such as: Neon Therapeutics, Gritstone Oncology, Advaxis/Amgen, BioNTech, Moderna/Merck, Genocea Biosciences, ISA Pharmaceuticals, Nouscom, EpiVax Inc., and Vaccibody.

In addition, and prior to regulatory approval, if ever, our vaccines and our other product candidates may compete for access to patients with other products in clinical development, with products approved for use in the indications we are studying, or with off-label use of products in the indications we are studying. We anticipate that we will face increased competition in the future as new companies enter markets we seek to address and scientific developments surrounding immunotherapy and other traditional cancer therapies continue to accelerate.

We are aware of compounds that claim to be comparable to QS-21 Stimulon that are being used in clinical trials. Several other vaccine adjuvants are in development or in use and could compete with QS-21 Stimulon for inclusion in vaccines. These adjuvants may include but are not limited to: (1) oligonucleotides, under development by Pfizer, Idera, and Dynavax, (2) MF59, under development by Novartis, (3) IC31, under development by Intercell (now part of Valneva), and (4) MPL, under development by GSK. In the past, we have provided QS-21 Stimulon to other entities under materials transfer arrangements. In at least one instance, it is possible that this material was used unlawfully to develop synthetic formulations and/or derivatives of QS-21. In addition, companies such as Adjuvance Technologies, Inc., CSL Limited, and Novavax, Inc., as well as academic institutions and manufacturers of saponin extracts, are developing saponin adjuvants, including derivatives and synthetic formulations. These sources may be competitive to our ability to execute future partnering and licensing arrangements involving QS-21 Stimulon. The existence of products developed by these and other competitors, or other products of which we are not aware, or which other companies may develop in the future, may adversely affect the marketability of products developed or sold using QS-21 Stimulon.

We are also aware of a third party that manufactures pre-clinical material purporting to be comparable to QS-21 Stimulon. The claims being made by this third party may create marketplace confusion and have an adverse effect on the goodwill generated by us and our partners with respect to QS-21 Stimulon. We are also aware of at least two additional manufacturers of QS-21. Any diminution of this goodwill may have an adverse effect on our ability to commercialize future products, if any, incorporating this technology, either alone or with a third party.

Employees

As of February 28, 2019, we had 294 employees, of whom 90 were PhDs and three were MDs. None of our employees are subject to a collective bargaining agreement. We believe that we have good relations with our employees.

Corporate History

Antigenics L.L.C. was formed as a Delaware limited liability company in 1994 and was converted to Antigenics Inc., a Delaware corporation, in February 2000 in conjunction with our initial public offering of common stock. On January 6, 2011, we changed our name from Antigenics Inc. to Agenus Inc.

Availability of Periodic SEC Reports

Our Internet website address is www.agenusbio.com. We make available free of charge through our website our annual reports on Form 10-K, quarterly reports on Form 10-Q, current reports on Form 8-K, and amendments to those reports filed or furnished pursuant to Section 13(a) or 15(d) of the Securities Exchange Act of 1934, as amended (“Exchange Act”), as soon as reasonably practicable after we electronically file such material with, or furnish such material to, the Securities and Exchange Commission (the “SEC”). The contents of our website are not part of, or incorporated into, this document. In addition, we regularly use our website to post information regarding our business, product development programs and governance, and we encourage investors to use our website, particularly the information in the sections entitled “Financial” and “News,” as sources of information about us.

The SEC maintains an Internet site that contains reports, proxy and information statements, and other information regarding issuers that file electronically with the SEC at www.sec.gov.

The contents of the websites referred to above are not incorporated into this filing. Further, our references to the URLs for these websites are intended to be inactive textual references only.

Item 1A. Risk Factors

Our future operating results could differ materially from the results described in this Annual Report on Form 10-K due to the risks and uncertainties described below. You should consider carefully the following information about risks below in evaluating our business. If any of the following risks actually occur, our business, financial conditions, results of operations and future growth prospects would likely be materially and adversely affected. In these circumstances, the market price of our common stock would likely decline.

We cannot assure investors that our assumptions and expectations will prove to be correct. Important factors could cause our actual results to differ materially from those indicated or implied by forward-looking statements. See “Note Regarding Forward-Looking Statements” in this Annual Report on Form 10-K. Factors that could cause or contribute to such differences include those factors discussed below.

Risks Related to our Business

If we incur operating losses for longer than we expect, or we are not able to raise additional capital, we may be unable to continue our operations, or we may become insolvent.

Our net losses for the years ended December 31, 2018, 2017, and 2016, were \$162.0 million, \$120.7 million, and \$127.0 million, respectively. We expect to incur additional losses over the next several years as we continue to research and develop our technologies and pursue partnering opportunities, regulatory strategies, commercialization, and related activities. Furthermore, our ability to generate cash from operations is dependent on the success of our licensees and collaboration partners, as well as the likelihood and timing of new strategic licensing and partnering relationships and/or successful development and commercialization of product candidates, including through our antibody programs and platforms, our vaccine programs, and our saponin-based vaccine adjuvants.

On December 31, 2018, we had \$53.1 million in cash and cash equivalents. We believe that, based on our current plans and activities, including \$150.0 million of additional funding we received in connection with our transactions with Gilead subsequent to December 31, 2018, our cash on-hand will be sufficient to satisfy our liquidity requirements for more than one year from when these financial statements were issued.

To date, we have financed our operations primarily through the sale of equity and debt securities. In order to finance future operations, we will be required to raise additional funds in the capital markets, through arrangements with collaboration partners or from other sources. Additional financing may not be available on favorable terms, or at all. If we are unable to raise additional funds when we need them or if we incur operating losses for longer than we expect, we may not be able to continue some or all of our operations, or we may become insolvent. We also may be forced to license or sell technologies to others under agreements that are on unfavorable terms or allocate to third parties substantial portions of the potential value of these technologies.

There are a number of factors that will influence our future capital requirements, including, without limitation, the following:

- the number and characteristics of the product candidates we and our partners pursue;
 - our and our partners' ability to successfully develop, manufacture, and commercialize product candidates;
- the scope, progress, results and costs of researching and developing our future product candidates and conducting pre-clinical and clinical trials;

- the timing of, and the costs involved in, obtaining regulatory approvals for our and our licensees' product candidates;
- the cost of manufacturing;
- our ability to establish and maintain strategic partnerships, licensing or other arrangements and the financial terms of such arrangements;
- the costs involved in preparing, filing, prosecuting, maintaining, defending and enforcing our intellectual property rights;
- the costs associated with any successful commercial operations; and
- the timing, receipt and amount of sales of, or royalties on, our future products and those of our partners, if any.

General economic conditions in the United States economy and abroad may have a material adverse effect on our liquidity and financial condition, particularly if our ability to raise additional funds is impaired. The ability of potential patients and/or health care payers to pay for our future products, if any, could also be adversely impacted, thereby limiting our potential revenue. In addition, any negative impacts from any deterioration in the credit markets on our collaboration partners could limit potential revenue from our product candidates.

Our obligations to HCR and the holders of our 2015 Subordinated Notes could materially and adversely affect our liquidity.

In January 2018, we and our wholly-owned subsidiary, Antigenics LLC ("Antigenics"), entered into a Royalty Purchase Agreement with HCR, pursuant to which HCR purchased 100% of Antigenics' worldwide rights to receive royalties from GSK on sales of GSK's vaccines containing our QS-21 Stimulon adjuvant. As consideration for the purchase of the royalty rights, HCR paid \$190.0 million at closing, less certain transaction expenses. Of the closing proceeds, approximately \$161.9 million was used to redeem Antigenics' \$115.0 million principal amount of notes issued pursuant to the Note Purchase Agreement with Oberland Capital SA Zermatt LLC, and we retained approximately \$28.0 million of net proceeds. Antigenics is also entitled to receive up to \$40.35 million in milestone payments based on sales of GSK's vaccines as follows: (i) \$15.1 million upon reaching \$2.0 billion last-twelve-months net sales any time prior to 2024 and (ii) \$25.25 million upon reaching \$2.75 billion last-twelve-months net sales any time prior to 2026. Antigenics will owe approximately \$25.9 million to HCR in 2021 if neither of the following sales milestones are achieved: (i) 2019 sales of GSK's vaccines exceed \$1.0 billion or (ii) 2020 sales of GSK's vaccines exceed \$1.75 billion (the "Rebate Payment"). As part of the transaction, we provided a guaranty for the potential Rebate Payment and secured the obligation with substantially all of our assets pursuant to a security agreement. If GSK's sales do not achieve either of the relevant milestones and we are obligated to make the Rebate Payment, our liquidity could be materially and adversely affected.

In February 2015, we exchanged senior subordinated promissory notes that we issued in 2013 for new senior subordinated promissory notes in the aggregate principal amount of \$5.0 million with annual interest at 8%, and we issued an additional \$9.0 million principal amount of such notes (the "2015 Subordinated Notes"). The 2015 Subordinated Notes were originally due February 2018, and in March 2017, we amended the 2015 Subordinate Notes to extend the maturity date to February 2020. The 2015 Subordinated Notes include default provisions that allow for the acceleration of the principal payment of the 2015 Subordinated Notes in the event we become involved in certain bankruptcy proceedings, become insolvent, fail to make a payment of principal or (after a grace period) interest on the 2015 Subordinated Notes, default on other indebtedness with an aggregate principal balance of \$13.5 million or more if such default has the effect of accelerating the maturity of such indebtedness, or become subject to a legal judgment or similar order for the payment of money in an amount greater than \$13.5 million if such amount will not be covered by third-party insurance. If we default on the 2015 Subordinated Notes and the repayment of such indebtedness is accelerated, our liquidity could be materially and adversely affected.

If we do not have sufficient cash on hand to pay the Rebate Payment when due, or to otherwise service our 2015 Subordinated Notes, we may be required, among other things, to:

- seek additional financing in the debt or equity markets;
- refinance or restructure all or a portion of our indebtedness;

sell, out-license, or otherwise dispose of assets; and/or

reduce or delay planned expenditures on research and development and/or commercialization activities.

Such measures might not be sufficient to enable us to make principal and interest payments. In addition, any such financing, refinancing, or sale of assets might not be available on favorable terms, if at all.

Our AGEN2034 and AGEN1884 antibody programs are in potential registrational studies, and there is no guarantee that we will be successful in advancing these through clinical development on our desired timeline, if at all, or that we will be able to commercialize them successfully.

Our anti-PD-1 and anti-CTLA-4 programs (AGEN2034 and AGEN1884, respectively) are in clinical trials that included a Phase 1 dose escalation with expansion cohorts in multiple solid tumors. These molecules are now in expansion trials with both anti-PD-1 monotherapy and anti-PD-1 and anti-CTLA-4 combination trials for patients with second-line cervical cancer that are designed to support one or more Biologic License Application (“BLA”) filings as soon as 2020. If approved, we intend to commercialize these assets in 2021. These timelines are aggressive and subject to various factors outside of our control, including patient accrual rates for our clinical trials. If our trials are unable to accrue patients at the rate we expect, we are unlikely to hit our anticipated timelines and our business and financial prospects could be materially adversely affected. In addition, in order to file a BLA and seek accelerated approval, we must also launch a confirmatory trial and have it be substantially underway at that time. We have not yet initiated a confirmatory trial. There is no guarantee that we will be able to file a BLA in 2020, if at all.

We have previously presented early data on these programs at major oncology conferences that demonstrated a clinical benefit (i.e., complete response, partial response or disease stabilization) in more than 60% of patients treated with AGEN1884 and AGEN2034. Even though we have observed positive results to date, they may not necessarily be predictive of the final results of the trials or future clinical trials. Many companies in the pharmaceutical, biopharmaceutical and biotechnology industries have suffered significant setbacks in clinical trials after achieving positive results, and we cannot be certain that we will not face similar setbacks.

Even if AGEN2034 and/or AGEN1884 are approved, there is no guarantee that we will be able to successfully commercialize them or penetrate any commercial markets. We are initially targeting cervical cancer, which is a small subset of the overall market. We intend to use proceeds from our sales of any Biotech Electronic Security Tokens to expand the development and commercial potential of AGEN2034, but there is no guarantee that we will sell sufficient tokens, if any, to do so. See “Risk Factors—Risks Relating to Our Tokens—There is no assurance that we will sell a sufficient number of tokens, if any, to meet our business or financial goals.”

Our other antibody programs are in early stage development, and there is no guarantee that we or our partners will be successful in advancing antibody product candidates into and through clinical development.

Our additional antibody programs are currently in early stage development, and many of our antibody programs are pre-clinical. Even if our pre-clinical studies or our and/or our partners’ clinical trials produce positive results, they may not necessarily be predictive of the results of future clinical trials. Many companies in the pharmaceutical, biopharmaceutical and biotechnology industries have suffered significant setbacks in clinical trials after achieving positive results in pre-clinical development or earlier clinical trials, and we cannot be certain that we will not face similar setbacks. These setbacks have been caused by, among other things, pre-clinical findings made while clinical trials were underway or safety or efficacy observations made in clinical trials, including adverse events. Moreover, pre-clinical and clinical data are often susceptible to varying interpretations and analyses, and many companies that believed their product candidates performed satisfactorily in pre-clinical studies and clinical trials nonetheless failed to obtain regulatory approval. If we and our partners fail to produce positive results in clinical trials of antibodies, our business and financial prospects would be materially adversely affected.

Although we are striving to file a number of INDs to advance novel antibodies, cell therapy candidates, and neoantigen vaccine combinations into the clinic, there is no guarantee that we will be able to do so on that timeline, if at all. Our stated timelines are aggressive and subject to various risks, including resource constraints. If we are unable to advance novel candidates into the clinic as planned due to resource constraints or otherwise, our business and partnering prospects could be materially adversely affected.

We have undergone significant growth across multiple locations over the past few years, and are focusing on further enhancing core areas and capabilities as we move toward commercialization. In addition, we have consolidated certain sites while expanding others to focus on our core priorities and future needs. We may encounter difficulties in managing these growth and/or consolidation efforts, either of which could disrupt our operations.

Since our acquisition of Agenus Switzerland Inc., formerly known as 4-Antibody AG (“4-AB”) in February 2014, we have more than tripled our headcount, in part through various acquisitions and the expansion of our research and development activities both nationally and internationally. While we have restructured our organization over the past few years, we expect to continue increasing our headcount in certain core areas as we continue to build our development, manufacturing and commercialization capabilities and integrate our acquired technology platforms. To manage these organizational changes, we must continue to implement and improve our managerial, operational and financial systems and continue to recruit, train and retain qualified personnel. If our management is unable to effectively manage our growth, our expenses may increase more than expected, our timelines may be delayed, our ability to generate revenue could be reduced, and we may not be able to implement our business strategy.

As part of our efforts to optimize efficiency across our organization, we closed our Jena, Germany office in 2016 and consolidated these operations in the United Kingdom and Switzerland. In 2017, we completed a reduction in force in our Lexington, MA facility, which included certain members of our management, in line with our prioritization efforts, and we closed our office in Basel, Switzerland and transferred our research and development assets and capabilities there to the United Kingdom. If these transition efforts prove to be unsuccessful, or if we identify management or operational gaps in connection with our changes, it could cause delays in discovery timelines and increased costs for certain of our internal and partnered programs, which also could have an adverse effect on our business, financial condition and results of operations. We are still in the process of liquidating 4-AB and transferring intellectual property rights from Switzerland to the United States or elsewhere. There could be adverse tax consequences resulting from this migration of intellectual property rights, which could have an adverse effect on our business and operations.

Our synthetic Heat Shock Protein (“HSP”) peptide-based platform is in early stage development, and there is no guarantee that a product candidate will progress from this platform.

In June 2014, we reported positive results from a Phase 2 trial with HerpVTM, a vaccine candidate for genital herpes from our synthetic HSP peptide-based platform. The Phase 2 trial met its formal endpoints, subjects were not followed long enough to determine whether the magnitude of the effect on viral load would be sufficient to significantly reduce the incidence, severity, or duration of herpetic lesions or reduce the risk of viral transmission. Although we have not advanced this program into a Phase 3 trial, we initiated our ASV synthetic cancer vaccine program based on our prior findings with this platform. We initiated our first clinical trial for our first AutoSynVax product candidate in 2017 and reported safety and immunogenicity of the vaccine at CIMT2018. Although we are planning to initiate a combination trial with ASV and one or more of our antibodies, the timeline is uncertain and there is no guarantee that we will be able to do so at all. Furthermore, it is possible that research and discoveries by others will render any product candidate from this platform as obsolete or noncompetitive.

We may not be able to advance clinical development or commercialize our cancer vaccine candidates or realize any benefits from these programs.

The probability of future clinical development efforts leading to marketing approval and commercialization of Prophage vaccines is highly uncertain. Prophage vaccines have been in clinical development for over 16 years, including multiple Phase 1 and 2 trials in eight different tumor types as well as randomized Phase 3 trials in metastatic melanoma and adjuvant renal cell carcinoma. To date, the only marketing approval for Prophage is in Russia where commercialization of the approved product was unsuccessful. All of our currently planned trials involving Prophage are intended to be sponsored by third parties, and there is no guarantee that they will occur at all.

Our current clinical trial plans with Prophage vaccines entail one government sponsored IND in which we provide support and product supply. For third-party sponsored trials, we lack the ability to control trial design, timelines, tumor tissue procurement and data availability. For example, in January 2017, we announced a clinical trial collaboration with the National Cancer Institute (“NCI”), whereby the NCI is conducting a double-blind, randomized controlled Phase 2 trial to evaluate the effect of Prophage vaccine in conjunction with Merck’s pembrolizumab on the overall survival rate of patients with newly diagnosed glioblastoma (“ndGBM”). In addition, the Phase 2 trial of Prophage vaccine in combination with bevacizumab in patients with surgically resectable recurrent glioma that was being conducted under the sponsorship of the Alliance for Clinical Trials in Oncology, a cooperative group of the NCI, has been closed. Our other cancer vaccine programs (ASV and PSV) are in Phase 1 and pre-clinical development, respectively, and there is no guarantee that they will successfully advance in and through the clinic. ASV also utilizes QS-21 Stimulon, and any inability or delay in securing adequate supplies of the adjuvant could have an adverse impact on the program or otherwise delay timelines. Current and future studies may eventually be terminated due to, among other things, slow enrollment, lack of probability that they will yield useful translational and/or efficacy data, lengthy timelines, or the unlikelihood that results will support timely or successful regulatory filings.

Changes in our manufacturing strategies, manufacturing problems, or increased demand may cause delays, unanticipated costs, or loss of revenue streams within or across our programs.

Our antibody programs will require substantial manufacturing development and investment to progress. We are currently progressing a portfolio of antibody programs that are at different stages of development. If these efforts are delayed or do not produce the desired outcomes, this will cause delays in development timelines and increased costs, which may cause us to limit the size and scope of our efforts and studies. In 2015, we secured our own antibody manufacturing capabilities with the purchase of a manufacturing pilot plant from XOMA Corporation (“XOMA”), and we expect this facility to supply us with antibody drug substance requirements through clinical proof-of-concept studies. We will also need to develop or secure later phase and/or commercial manufacturing capabilities for larger, registrational studies or any commercial supply requirements. For the programs for which we will produce our own drug substance, we will continue to rely on third parties for fill-finish services and other parts of the manufacturing process. These services include the storage and maintenance of our drug substance during all stages of the

manufacturing process. While we maintain insurance to cover certain potential losses, there is no guarantee that our insurance coverage will be adequate. Furthermore, we currently rely on contract manufacturing organizations (“CMOs”) and contract research organizations (“CROs”) to support some of our existing antibody programs. Our dependence on external CMOs for the manufacture of certain antibodies results in intrinsic risks to our performance, timelines, and costs of our accelerated development plans, and which could divert resources away from our antibody programs and/or lead to delays in the development of our product candidates. In the event that our antibody programs require progressively larger production capabilities, our options for qualified CMOs may become more limited.

To date, we have manufactured our Prophage vaccines in our Lexington, MA facility. Manufacturing of the Prophage vaccines is complex, and various factors could cause delays or an inability to supply the vaccine. Deviations in the processes controlling manufacture or deficiencies in size or quality of source material could result in production failures. Specific vulnerabilities in the process may exist in tumor types in which quality or quantity of tissue is limited. In addition, regulatory bodies may require us to make our manufacturing facility a single product facility. In such an instance, we would no longer have the ability to manufacture Prophage vaccines in addition to other product candidates in our current facility.

We have given our corporate QS-21 Stimulon licensee, GSK, manufacturing rights for QS-21 Stimulon for use in their product programs. We have retained the right to manufacture QS-21 for ourselves and third parties, although no other such programs are anticipated to bring us substantial revenues in the near future, if ever. Although we have the right to secure certain quantities of QS-21 from GSK and we have some internal supply in-house, we currently do not have an alternative long-term supply partner for this adjuvant.

Our ability to efficiently manufacture our product candidates is contingent, in part, upon our own, and our CMOs’, ability to ramp up production in a timely manner without the benefit of years of experience and familiarity with the processes, which we may not be able to adequately transfer. We currently rely upon and expect to continue to rely upon third parties, potentially including our collaborators or licensees, to produce materials required to support our product candidates, pre-clinical studies, clinical trials, and any future commercial efforts. A number of factors could cause production interruptions at either our manufacturing facility or the facilities of our CMOs or suppliers, including equipment malfunctions, labor or employment retention problems, natural disasters, power outages, terrorist activities, or disruptions in the operations of our suppliers. Alternatively, there is the possibility we may have excess manufacturing capacity if product candidates do not progress as planned.

As mentioned above, reliance on third-party manufacturers entails risks to which we would not be subject if we manufactured all of our product candidates ourselves, including reliance on the third party for regulatory compliance, the possibility of breach of the manufacturing agreement by the third party because of factors beyond our control, and the possibility of termination or non-renewal of the agreement by the third party, based on its own business priorities, at a time that is costly or inconvenient for us.

Biopharmaceutical manufacturing is also subject to extensive government regulation. Components of a finished therapeutic product approved for commercial sale or used in late-stage clinical trials must be manufactured in accordance with current good manufacturing practices. These regulations govern manufacturing processes and procedures (including record-keeping) and the implementation and operation of quality systems to control and assure the quality of investigational products and products approved for sale. Our facilities and quality systems and the facilities and quality systems of some or all of our third-party contractors must pass a pre-approval inspection for compliance with the applicable regulations as a condition of regulatory approval of a product candidate. In addition, facilities are subject to on-going inspections and routine audits, and minor changes in manufacturing processes may require additional regulatory approvals and audits, either of which could cause us to incur significant additional costs, set-backs or delays and eventual loss of revenue.

Risks associated with doing business internationally could negatively affect our business.

We currently have research and development operations in the United Kingdom, and we expect to pursue pathways to develop and commercialize our product candidates in both U.S. and non-U.S. jurisdictions. Various risks associated with foreign operations may impact our success. Possible risks of foreign operations include fluctuations in the value of foreign and domestic currencies, requirements to comply with various jurisdictional requirements such as data privacy regulations, disruptions in the import, export, and transportation of patient tumors and our products or product candidates, the product and service needs of foreign customers, difficulties in building and managing foreign relationships, the performance of our licensees or collaborators, geopolitical instability, unexpected regulatory, economic, or political changes in foreign and domestic markets, including without limitation any resulting from the United Kingdom's withdrawal from the European Union or our current political regime, and limitations on the flexibility of our operations and costs imposed by local labor laws.

Our competitors may have superior products, manufacturing capability, selling and marketing expertise and/or financial and other resources.

Our product candidates and the product candidates in development by our collaboration partners may fail because of competition from major pharmaceutical companies and specialized biotechnology companies that market products, or that are engaged in the development of product candidates and for the treatment cancer. Many of our competitors, including large pharmaceutical companies, have greater financial and human resources and more experience than we do. Our competitors may:

- develop safer or more effective therapeutic drugs or therapeutic vaccines and other products;
- establish superior intellectual property positions;
- discover technologies that may result in medical insights or breakthroughs, which render our drugs or vaccines obsolete, possibly before they generate any revenue, if ever;
- adversely affect our ability to recruit patients for our clinical trials;
- solidify partnerships or strategic acquisitions that may increase the competitive landscape;
 - develop or commercialize their product candidates sooner than we commercialize our own, if ever; or
- implement more effective approaches to sales and marketing and capture some of our potential market share.

There is no guarantee that our product candidates will be able to compete with potential future products being developed by our competitors.

The CPM landscape is crowded with several competitors developing assets against a number of targets. Development plans are spread out across various indications and lines of therapy, either alone or in combination with other assets. Competitors range from small cap to large cap companies, with assets in pre-clinical or clinical stages of development. Therefore, the landscape is dynamic and constantly evolving. We and our partners have CPM antibody programs, currently in clinical stage development targeting PD-1, CTLA-4, GITR, OX40, TIM-3 and LAG-3. We are aware of many companies that have antibody-based products on the market or in clinical development that are directed to the same biological targets as these programs, including, without limitation, the following: (1) BMS markets ipilimumab, an anti-CTLA-4 antibody, and nivolumab, an anti-PD-1 antibody, and is developing additional antagonists to LAG-3 and TIM-3. BMS also has next generation anti-CTLA-4 antibodies in the clinic, which may be competitive to our next generation anti-CTLA-4 program, (2) Merck has an approved anti-PD-1 antibody, as well as anti-CTLA-4 and LAG-3 antagonists and an anti-GITR agonist in clinical development, (3) Regeneron has an approved anti-PD-1 antibody as well as antibodies targeting CTLA-4 and LAG-3 in clinical development, (4) AstraZeneca has an approved anti PD-L1 antibody, as well as an anti-CTLA-4 targeting antibody in the clinic, (5) Pfizer has an approved anti-PD-L1 (with Merck KgaA) as well as anti-PD-1, and anti-OX40 antibodies in clinical development, and (6) Roche/Genentech has an approved anti-PD-L1 antibody. Besides these PD-1 and PD-L1 antibodies that were approved in the U.S., we are also aware of competitors with approved PD-1 agents in ex-U.S. geographies such as China. These include Innovent Biologics and Shanghai Junshi Biosciences. We are also aware of other competitors with PD-1/PD-L1 agents in clinical development, including but not limited to AbbVie, Arcus Biosciences, Boehringer Ingelheim, Tesaro, Beigene, Eli Lilly, Jiangsu HengRui Medicine, MacroGenics/Incyte, CytomX/BMS, Novartis, Symphogen, Jounce Therapeutics, Gilead Sciences, Janssen, CBT Pharmaceuticals/Genor Biopharma, Checkpoint Therapeutics, CStone Pharmaceuticals, Livzon MabPharm Inc, Suzhou Alphamab, Mabspace Biosciences, Henlix Biotech Inc., Akeso Biopharma and CSPC ZhongQi Pharmaceutical Technology. We are also aware of competitors with pre-clinical antibodies against PD-1 or PD-L1. In addition, we are aware of competitors with clinical stage antibodies against GITR, OX40, LAG-3, TIM-3 as well as our earlier stage programs such as TIGIT and CD137. As outlined above, some of these include, but are not limited to, BMS, Pfizer, Novartis, Merck, Tesaro, Regeneron, Eli Lilly, OncoMed, Boehringer Ingelheim, Potenza, Arcus Biosciences, GlaxoSmithKline, AbbVie, Leap Therapeutics and Symphogen. Additionally, we are aware of competitors developing preclinical assets and bispecifics against each of the above targets. There is no guarantee that our antibody product candidates will be able to compete with our competitors' antibody products and product candidates.

We are conducting both single arm and combination trials in second line cervical cancer. We are aware that Merck's PD-1 antagonist, Keytruda, has been approved in advanced cervical cancer. We are also aware of industry sponsored clinical trials, including exploratory studies, that are underway in this setting. Clinical stage competitors include, but are not limited to, Regeneron (anti-PD-1), Ono Pharmaceuticals and BMS (anti-PD-1 alone or in combination with agents against other checkpoint targets), Seattle Genetics and Genmab (antibody drug conjugate targeting Tissue Factor), Iovance Biotherapeutics (autologous TILs), Genor Biopharma and Lee Pharmaceuticals. Additionally, we are aware of other early stage clinical trials testing alternate checkpoint targets in cervical cancer patients. These include, but are not limited to, OX40 +/- CD137 agonists (Pfizer) and anti-PD-1 + anti-ICOS (GSK/Merck).

We have autologous vaccine programs in development including our Prophage vaccine in clinical development for GBM. We are aware of other therapeutic options in GBM that could compete with our vaccine, including but not limited to the following: Merck

markets temozolomide for treatment of patients with ndGBM and refractory astrocytoma. Other companies are developing vaccines for the treatment of patients with ndGBM, including, but not limited to, Northwest Biotherapeutics (DC-Vax), Mimivax Inc. (SurVaxM) and Annias Immunotherapeutics (CMV Vaccine). Other companies may begin development programs as well. We are advancing our neoantigen vaccine, AutoSynVax, in solid tumors. There are companies advancing individualized or synthetic vaccine technologies and/or patient-specific medicine techniques that compete with our HSP based vaccines such as: Neon Therapeutics, Gritstone Oncology, Advaxis/Amgen, BioNTech, Moderna/Merck, Genocea Biosciences, ISA Pharmaceuticals, Nouscom, EpiVax Inc., and Vaccibody.

In addition, and prior to regulatory approval, if ever, our vaccines and our other product candidates may compete for access to patients with other products in clinical development, with products approved for use in the indications we are studying, or with off-label use of products in the indications we are studying. We anticipate that we will face increased competition in the future as new companies enter markets we seek to address and scientific developments surrounding immunotherapy and other traditional cancer therapies continue to accelerate.

We are aware of compounds that claim to be comparable to QS-21 Stimulon that are being used in clinical trials. Several other vaccine adjuvants are in development or in use and could compete with QS-21 Stimulon for inclusion in vaccines. These adjuvants may include but are not limited to: (1) oligonucleotides, under development by Pfizer, Idera, and Dynavax, (2) MF59, under development by Novartis, (3) IC31, under development by Intercell (now part of Valneva), and (4) MPL, under development by GSK. In the past, we have provided QS-21 Stimulon to other entities under materials transfer arrangements. In at least one instance, it is possible that this material was used unlawfully to develop synthetic formulations and/or derivatives of QS-21. In addition, companies such as Adjuvance Technologies, Inc., CSL Limited, and Novavax, Inc., as well as academic institutions and manufacturers of saponin extracts, are developing saponin adjuvants, including derivatives and synthetic formulations. These sources may be competitive to our ability to execute future partnering and licensing arrangements involving QS-21 Stimulon. The existence of products developed by these and other competitors, or other products of which we are not aware, or which other companies may develop in the future, may adversely affect the marketability of products developed or sold using QS-21 Stimulon.

We are also aware of a third party that manufactures pre-clinical material purporting to be comparable to QS-21 Stimulon. The claims being made by this third party may create marketplace confusion and have an adverse effect on the goodwill generated by us and our partners with respect to QS-21 Stimulon. We are also aware of at least two additional manufacturers of QS-21. Any diminution of this goodwill may have an adverse effect on our ability to commercialize future products, if any, incorporating this technology, either alone or with a third party.

Failure to realize the anticipated benefits of our strategic acquisitions and licensing transactions could adversely affect our business, operations and financial condition.

An important part of our business strategy has been to identify and advance a pipeline of product candidates by acquiring and in-licensing product candidates, technologies and businesses that we believe are a strategic fit with our existing business. Since we acquired 4-AB in 2014, we have completed numerous additional strategic acquisitions and licensing transactions. The ultimate success of these strategic transactions entails numerous operational and financial risks, including:

- higher than expected development and integration costs;
- difficulty in combining the technologies, operations and personnel of acquired businesses with our technologies, operations and personnel;
- exposure to unknown liabilities;
- difficulty or inability to form a unified corporate culture across multiple office sites both nationally and internationally;
- inability to retain key employees of acquired businesses;

• disruption of our business and diversion of our management's time and attention; and
• difficulty or inability to secure financing to fund development activities for such acquired or in-licensed product candidates, technologies or businesses.

We have limited resources to integrate acquired and in-licensed product candidates, technologies and businesses into our current infrastructure, and we may fail to realize the anticipated benefits of our strategic transactions. Any such failure could have an adverse effect on our business, operations and financial condition.

Failure to enter into and/or maintain significant licensing, distribution and/or collaboration agreements in a timely manner and on favorable terms to us may hinder or cause us to cease our efforts to develop and commercialize our product candidates, increase our development timelines, and/or increase our need to rely on partnering or financing mechanisms, such as sales of debt or equity securities, to fund our operations and continue our current and anticipated programs.

As previously noted, our ability to advance our antibody programs depends in part on collaboration agreements such as our collaborations with Gilead and Incyte. In addition, from time to time we engage in efforts to enter into licensing, distribution and/or collaboration agreements with one or more pharmaceutical or biotechnology companies to assist us with development and/or commercialization of our other product candidates. If we are successful in entering into such agreements, we may not be able to negotiate agreements with economic terms similar to those negotiated by other companies. We may not, for example, obtain significant upfront payments, substantial royalty rates or milestones. If we fail to enter into any such agreements in a timely manner or at all, our efforts to develop and/or commercialize our product candidates may be undermined. In addition, if we do not raise funds through any such agreements, we will need to rely on other financing mechanisms, such as sales of debt or equity securities, to fund our operations. Such financing mechanisms, if available, may not be sufficient or timely enough to advance our programs forward in a meaningful way in the short-term.

Because we rely on collaborators and licensees for the development and commercialization of certain of our product candidate programs, these programs may not prove successful, and/or we may not receive significant payments from such parties.

Part of our strategy is to develop and commercialize many of our product candidates by continuing or entering into arrangements with academic, government, or corporate collaborators and licensees. Our success depends on our ability to negotiate such agreements on favorable terms and on the success of the other parties in performing research, pre-clinical and clinical testing, completing regulatory applications, and commercializing product candidates. Our research, development, and commercialization efforts with respect to antibody candidates from our technology platforms are, in part, contingent upon the participation of institutional and corporate collaborators. For example, in February 2015, we began a broad collaboration with Incyte to pursue the discovery and development of antibodies, and in December 2018 we entered into a partnership with Gilead relating to five of our antibody programs. Furthermore, we have a collaboration arrangement with Recepta for CTLA-4 and PD-1, giving Recepta rights to certain South American countries and requiring us to agree upon development plans for these product candidates. Disagreements or the failure of either party to perform satisfactorily could have an adverse impact on these programs.

The Brain Tumor Trials Collaborative, through the NCI, is sponsoring a Phase 2 clinical trial of our Prophage vaccine candidate in combination with Merck's pembrolizumab in patients with glioma. When our licensees or third-party collaborators sponsor clinical trials using our product candidates, we cannot control the timing of enrollment, data readout, or quality of such trials or related activities.

Development activities for our collaboration programs may fail to produce marketable products due to unsuccessful results or abandonment of these programs, failure to enter into future collaborations or license agreements, or the inability to manufacture product supply requirements for our collaborators and licensees. Several of our agreements also require us to transfer important rights and regulatory compliance responsibilities to our collaborators and licensees. As a result of these collaboration agreements, we will not control the nature, timing, or cost of bringing these product candidates to market. Our collaborators and licensees could choose not to, or be unable to, devote resources to these arrangements or adhere to required timelines, or, under certain circumstances, may terminate these arrangements early. They may cease pursuing product candidates or elect to collaborate with different companies. In addition, these collaborators and licensees, outside of their arrangements with us, may develop technologies or products that are competitive with those that we are developing. From time to time, we may also become involved in disputes with our collaborators or licensees. Such disputes could result in the incurrence of significant expense, or the termination of collaborations. We may be unable to fulfill all of our obligations to our collaborators, which may result

in the termination of collaborations. As a result of these factors, our strategic collaborations may not yield revenue. Furthermore, we may not be able to enter into new collaborations on favorable terms or at all. Failure to generate significant revenue from collaborations could increase our need to fund our operations through sales of debt or equity securities and would negatively affect our business prospects.

Our internal computer systems, or those of our third-party CROs, CMOs, licensees, collaborators or other contractors or consultants, may fail or suffer security breaches, which could result in a material disruption in our business and operations or could subject us to sanctions and penalties that could have a material adverse effect on our reputation or financial condition.

Despite the implementation of security measures, our internal computer systems and those of our current and future CROs, CMOs, licensees, collaborators and other contractors and consultants are vulnerable to damage from computer viruses, unauthorized access, natural disasters, terrorism, war and telecommunication and electrical failures. Potential vulnerabilities can also be exploited from inadvertent or intentional actions of our employees, third-party vendors, business partners, or by malicious third parties. Attacks of this nature are increasing in their frequency, levels of persistence, sophistication and intensity, and are being conducted by sophisticated and organized groups and individuals with a wide range of motives (including, but not limited to, industrial espionage)

and expertise, including organized criminal groups, “hacktivists,” nation states and others. In addition to the extraction of sensitive information, such attacks could include the deployment of harmful malware, ransomware, denial-of-service attacks, social engineering and other means to affect service reliability and threaten the confidentiality, integrity and availability of information. In addition, the prevalent use of mobile devices increases the risk of data security incidents. While we are not aware of any such material system failure, accident or security breach to date, if such an event were to occur and cause interruptions in our operations, it could result in a material disruption of our development programs and our business operations. For example, the loss of clinical trial data from completed, on-going or future clinical trials could result in delays in our regulatory approval efforts and significant costs to recover or reproduce the data. Likewise, we rely on third parties to manufacture certain of our drug candidates and conduct clinical trials, and similar events relating to their computer systems could also have a material adverse effect on our business. To the extent that any disruption or security breach were to result in a loss of, or damage to, our data or applications, or inappropriate disclosure of confidential or proprietary information, we could incur liabilities and the further development and commercialization of our product candidates could be delayed. We do not maintain cyber liability insurance, and would therefore have no coverage for any losses resulting from any data security incident.

We use and store customer, vendor, employee and business partner and, in certain instances patient, personally identifiable information in the ordinary course of our business. We are subject to various domestic and international privacy and security regulations, including but not limited to the Health Insurance Portability and Accountability Act of 1996 (“HIPAA”), which mandates, among other things, the adoption of uniform standards for the electronic exchange of information in common healthcare transactions, as well as standards relating to the privacy and security of individually identifiable health information, which require the adoption of administrative, physical and technical safeguards to protect such information. In addition, many states have enacted comparable laws addressing the privacy and security of health information, some of which are more stringent than HIPAA. Failure to comply with these standards, or a computer security breach or cyber-attack that affects our systems or results in the unauthorized release of proprietary or personally identifiable information, could subject us to criminal penalties and civil sanctions, and our reputation could be materially damaged, and our operations could be impaired. We may also be exposed to a risk of loss or litigation and potential liability, which could have a material adverse effect on our business, results of operations and financial condition.

We are highly reliant on certain members of our management team. In addition, we have limited internal resources and if we fail to recruit and/or retain the services of key employees and external consultants as needed, we may not be able to achieve our strategic and operational objectives.

Garo H. Armen, Ph.D., the Chairman of our Board of Directors and our Chief Executive Officer who co-founded the Company in 1994, is integral to building our company and developing our technology. If Dr. Armen is unable or unwilling to continue his relationship with Agenus, our business may be adversely impacted. We have an employment agreement with Dr. Armen, and he plays an important role in our day-to-day activities. We do not carry a key employee insurance policy for Dr. Armen or any other employee.

Our future growth success depends to a significant extent on the skills, experience and efforts of our executive officers and key members of our clinical and scientific staff. We face intense competition for qualified individuals from other pharmaceutical, biopharmaceutical and biotechnology companies, as well as academic and other research institutions. We may be unable to retain our current personnel or attract or assimilate other highly qualified management and clinical personnel in the future on acceptable terms. The loss of any or all of these individuals could harm our business and could impair our ability to support our collaboration partners or our growth generally. If our management is unable to effectively manage our growth, our expenses may increase more than expected, our ability to generate revenue could be reduced and we may not be able to implement our business strategy.

We intend to advance our cell therapy business through our subsidiary, AgenTus Therapeutics, eventually with separate funding. Moving intellectual property assets into AgenTus Therapeutics in foreign jurisdictions could have adverse tax consequences, and there is no guarantee that we will be able to attract external funding. Moreover, even if

the business is funded, there is no guarantee that it will be successful.

We are currently in the process of pursuing external funding and partnership opportunities to advance AgenTus Therapeutics, but Agenus is currently funding such operations. There is no guarantee that external funding will be available. If funding is available, there is no guarantee that it will be on attractive or acceptable terms, or that it will be adequate to advance the business to an inflection point for additional funding, including any potential initial public offering. Similarly, there is no guarantee that partnership opportunities will be available on attractive terms, if at all. If external funding is not available, we may be forced to either retire these programs or continue to use internal resources to advance them. In addition, our cell therapy assets are pre-clinical. Even if adequate funding and partnership opportunities are available, there is no guarantee that we will be successful in advancing one or more product candidates into and through clinical development. In addition, most of the efforts being made on behalf of AgenTus Therapeutics are being led by a separate AgenTus chief executive officer, utilizing Agenus' management team and internal G&A resources. The current structure could distract management and divert Agenus resources from Agenus' own core pipeline and programs.

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The cell therapy assets necessary to enable AgenTus Therapeutics are currently owned or controlled by Agenus in the United States and Switzerland. In connection with capitalizing AgenTus Therapeutics, these assets will be transferred or licensed to new legal entities within the United States and Europe and potentially others. Transferring these assets or licensing them on an exclusive basis would require that taxes be paid based on the fair market value of the assets. While we expect to have adequate net operating losses to offset any tax liabilities, there is no guarantee that this will be the case in all relevant jurisdictions. Moreover, we have previously disclosed our interest in potentially issuing a tax-free dividend to Agenus' stockholders in the form of stock of AgenTus Therapeutics. There is no guarantee that any such dividend will be tax-free or that it will be issued at all, or the timing thereof. If we issue a dividend in the form of stock, there could be adverse tax consequences for certain of our stockholders.

Calamities, power shortages or power interruptions could disrupt our business and materially adversely affect our operations.

If a natural disaster, power outage or other event occurred that prevented us from using all or a significant portion of our facilities, that damaged critical infrastructure (such as our manufacturing facility) or that otherwise disrupted operations, it may be difficult or, in certain cases, impossible for us to continue certain activities, such as for example our manufacturing capabilities, for a substantial period of time. We own an antibody pilot plant manufacturing facility and lease additional office space in Berkeley, CA. This location is in an area of seismic activity near active earthquake faults. Any earthquake, terrorist attack, fire, power shortage or other calamity affecting our facilities or those of third parties upon whom we depend may disrupt our business and could have a material adverse effect on our business, results of operations, financial condition and prospects. The disaster recovery and business continuity plans we have in place currently are limited and are unlikely to prove adequate in the event of a serious disaster or similar event. We may incur substantial expenses and delays as a result of the limited nature of our disaster recovery and business continuity plans, which could have a material adverse effect on our business.

We are dependent upon our collaboration with Gilead to further develop and commercialize certain of our antibody programs. If we or Gilead fail to perform as expected, the potential for us to generate future revenues under the collaboration could be significantly reduced, the development and/or commercialization of these antibodies may be terminated or substantially delayed, and our business could be adversely affected.

In December 2018, we entered into a series of agreements with Gilead to collaborate on the development and commercialization of up to five novel I-O therapies. Pursuant to the collaboration agreements, Gilead received (i) worldwide exclusive rights to AGEN1423, a bispecific antibody, (ii) the exclusive option to license exclusively AGEN1223, a bispecific antibody, and AGEN2373, a monospecific antibody, and (iii) the right of first negotiation for two additional, undisclosed programs. Gilead has the exclusive right to develop and commercialize AGEN1423, and we are eligible to receive potential development and commercial milestones of up to \$552.5 million in the aggregate, as well as tiered royalty payments on aggregate net sales ranging from the high single digit to mid-teen percent, subject to certain reductions under certain circumstances. Accordingly, the timely and successful completion by Gilead of clinical development and commercialization activities will significantly affect the timing and amount of any milestones or royalties we may receive for this program. Gilead's activities will be influenced by, among other things, the efforts and allocation of resources by Gilead, which we cannot control. With respect to the option programs, we are responsible for developing each program up to the option decision point, at which time Gilead may acquire exclusive rights to each program on option exercise. During the option period, we are eligible to receive milestones of up to \$30.0 million in the aggregate. If Gilead exercises an option, it would be required to pay an upfront license exercise fee of \$50.0 million for each option that is exercised. Following any option exercise, we would be eligible to receive additional development and commercial milestones of up to \$520.0 million in the aggregate for each such option program, as well as tiered royalty payments on aggregate net sales ranging from the high single digit to mid-teen percent, subject to certain reductions under certain circumstances. For either, but not both, of the option programs, we will have the right to opt-in to share Gilead's development and commercialization costs in the United State for such option program in exchange for a profit (loss) share on a 50:50 basis and revised milestone payments. There is no guarantee that we will receive any fees, milestones or royalties from Gilead. If Gilead does not exercise its

option for either of the option programs, there is no guarantee that we will be able to advance any such program ourselves or with another partner. If we wanted to partner either of the programs that are subject to a right of first negotiation with a third party other than Gilead, such discussions could be delayed and ultimately terminated as a result of Gilead's right of first negotiation. Accordingly, we may not be able to partner either of these programs with a third party other than Gilead on attractive terms, if at all.

We are dependent upon our collaboration with Incyte to further develop, manufacture and commercialize antibodies against certain targets. If we or Incyte fail to perform as expected, the potential for us to generate future revenues under the collaboration could be significantly reduced, the development and/or commercialization of these antibodies may be terminated or substantially delayed, and our business could be adversely affected.

In February 2017, we amended the terms of our collaboration agreement with Incyte to, among other things, convert the G1TR and OX40 programs from profit-share programs, where we and Incyte shared all costs and profits on a 50:50 basis, to royalty-bearing

programs, where Incyte funds 100% of the costs and we are eligible for potential milestones and royalties. In addition, the profit-share programs relating to TIGIT and one undisclosed target were removed from the collaboration, with TIGIT reverting to Agenus and the undisclosed target reverting to Incyte, each with a potential 15% royalty to the other party on any global net sales. The remaining three royalty-bearing programs in the collaboration targeting TIM-3, LAG-3 and one undisclosed target remain unchanged, and there are no more profit-share programs under the collaboration. For each program in the collaboration, we serve as the lead for pre-clinical development activities through the filing of an IND, and Incyte has exclusive rights and all decision-making authority for manufacturing, clinical development and commercialization. Accordingly, the timely and successful completion by Incyte of clinical development and commercialization activities will significantly affect the timing and amount of any royalties or milestones we may receive under the collaboration agreement. In addition, in March 2017 we transferred manufacturing responsibilities to Incyte for antibodies under that collaboration. Any delays or weaknesses in the ability of Incyte to successfully manufacture could have an adverse impact on those programs. Incyte's activities will be influenced by, among other things, the efforts and allocation of resources by Incyte, which we cannot control. If Incyte does not perform in the manner we expect or fulfill its responsibilities in a timely manner, or at all, the clinical development, manufacturing, regulatory approval, and commercialization efforts related to antibodies under the collaboration could be delayed or terminated. There can be no assurance that any of the development, regulatory or sales milestones will be achieved, or that we will receive any future milestone or royalty payments under the collaboration agreement. In September 2018, we sold to XOMA (US) LLC a portion of the royalties and milestones we are entitled to receive from Incyte.

In addition, our collaboration with Incyte may be unsuccessful due to other factors, including, without limitation, the following:

- Incyte may terminate the agreement or any individual program for convenience upon 12 months' notice;
- Incyte has control over the development of assets in the collaboration;
- Incyte may change the focus of its development and commercialization efforts or prioritize other programs more highly and, accordingly, reduce the efforts and resources allocated to our collaboration;
- Incyte may choose not to develop and commercialize antibody products, if any, in all relevant markets or for one or more indications, if at all; and
- If Incyte is acquired during the term of our collaboration, the acquirer may have competing programs or different strategic priorities that could cause it to reduce its commitment to our collaboration.

If Incyte terminates our collaboration agreement, we may need to raise additional capital and may need to identify and come to agreement with another collaboration partner to advance certain of our antibody programs. Even if we are able to find another partner, this effort could cause delays in our timelines and/or additional expenses, which could adversely affect our business prospects and the future of our antibody product candidates under the collaboration.

Comprehensive tax reform legislation could adversely affect our business and financial condition.

On December 22, 2017, President Trump signed into law the "Tax Cuts and Jobs Act" (the "TCJA") that significantly reformed the Internal Revenue Code of 1986, as amended. The TCJA, among other things, includes changes to U.S. federal tax rates, imposes significant additional limitations on the deductibility of interest and net operating loss carryforwards, allows for the expensing of capital expenditures, and puts into effect the migration from a "worldwide" system of taxation to a territorial system. Our net deferred tax assets and liabilities were revalued at the newly enacted U.S. corporate rate. We did not recognize any tax expense in the year of enactment as our net deferred tax assets have a full valuation allowance recorded. We continue to examine the impact this tax reform legislation may have on our business. The impact of this tax reform is uncertain and could be adverse.

Risks Related to Regulation of the Biopharmaceutical Industry

The drug development and approval process is uncertain, time-consuming, and expensive.

Drug development, including non-clinical testing and clinical development, and the process of obtaining regulatory approvals for new therapeutic products, is lengthy, expensive, and uncertain. For example, as of December 31, 2018, we had spent more than 20 years and \$809.2 million on our research and development programs. The development and regulatory approval processes also can vary substantially based on the therapeutic area, type, complexity, and novelty of the product. We must provide regulatory authorities with manufacturing, product characterization, and pre-clinical and clinical data demonstrating that our product candidates are safe and effective before they can be approved for commercial sale. It may take us many years to complete our testing, and failure can occur at any stage. Results of pre-clinical studies do not necessarily predict clinical results, and promising results in early clinical studies might not be confirmed in later studies. Any pre-clinical or clinical test may fail to produce results satisfactory to regulatory authorities for many reasons, including but not limited to emerging manufacturing or control issues, limitations of pre-clinical assessments, difficulties to enroll a sufficient number of patients, changing therapeutic landscape or failure to prospectively identify the benefit/risk profile of the new product. Pre-clinical and clinical data can be interpreted in different ways, which could delay, limit, or prevent

regulatory approval. Negative or inconclusive results from a pre-clinical study or clinical trial, adverse medical events during a clinical trial, or safety issues emerging with products of the same class of drug could require additional studies or cause a program to be terminated, even if other studies or trials relating to the program are successful. We or the FDA, other regulatory agencies, or an institutional review board may suspend or terminate human clinical trials at any time on various grounds.

The timing and success of a clinical trial is dependent on obtaining and maintaining sufficient cash resources, successful production of clinical trial material, enrolling sufficient patients in a timely manner, avoiding or mitigating serious or significant adverse patient reactions, and demonstrating efficacy of the product candidate in order to support a favorable risk versus benefit profile, among other considerations. The timing and success of our clinical trials, in particular, are also dependent on clinical sites and regulatory authorities accepting each trial's protocol, statistical analysis plan, product characterization tests, and final clinical results. In addition, regulatory authorities may request additional information or data that is not readily available. Delays in our ability to respond to such requests would delay, and failure to adequately address concerns would prevent, our commercialization efforts. We have encountered in the past, and may encounter in the future, delays in initiating trial sites and enrolling patients into our clinical trials. Future enrollment delays will postpone the dates by which we expect to complete the impacted trials and the potential receipt of regulatory approval. There is no guarantee we will successfully initiate and/or complete our clinical trials.

Delays or difficulties in obtaining regulatory approvals or clearances for our product candidates may:

- adversely affect the marketing of any products we or our licensees or collaborators develop;
- impose significant additional costs on us or our licensees or collaborators;
- diminish any competitive advantages that we or our licensees or collaborators may attain;
- limit our ability to receive royalties and generate revenue and profits; and
- adversely affect our business prospects and ability to obtain financing.

Delays or failures in our receiving regulatory approval for our product candidates in a timely manner may result in us having to incur additional development expense and subject us to having to secure additional financing. As a result, we may not be able to commercialize them in the time frame anticipated, and our business will suffer.

Even if we or our partners receive marketing approval for our product candidates, such product approvals could be subject to restrictions or withdrawals. Regulatory requirements are subject to change. Further, even if we or our partners receive marketing approval, we may not receive sufficient coverage and adequate reimbursement for our products.

Regulatory authorities generally approve products for particular indications. If an approval is for a limited indication, this limitation reduces the size of the potential market for that product. Product approvals, once granted, are subject to continual review and periodic inspections by regulatory authorities. Our operations and practices are subject to regulation and scrutiny by the United States government, as well as governments of any other countries in which we do business or conduct activities. Later discovery of previously unknown problems or safety issues, and/or failure to comply with domestic or foreign laws, knowingly or unknowingly, can result in various adverse consequences, including, among other things, possible delay in approval or refusal to approve a product, warning letters, fines, injunctions, civil penalties, recalls or seizures of products, total or partial suspension of production, refusal of the government to renew marketing applications, complete withdrawal of a marketing application, corrective action requirements, and/or criminal prosecution, withdrawal of an approved product from the market, and/or exclusion from government health care programs. Such regulatory enforcement could have a direct and negative impact on the product for which approval is granted and could have a negative impact on the approval of any pending applications for marketing approval of new drugs or supplements to approved applications.

Because we operate in a highly regulated industry, regulatory authorities could take enforcement action against us in connection with our licensees' or collaborators', and/or our business and marketing activities for various reasons. For example, the Foreign Corrupt Practices Act prohibits U.S. companies and their representatives from offering,

promising, authorizing, or making payments to foreign governmental officials for the purpose of obtaining or retaining business abroad.

From time to time, new legislation is passed into law that could significantly change the statutory provisions governing the approval, manufacturing, and marketing of products regulated by the FDA and other foreign health authorities. Additionally, regulations and guidance are often revised or reinterpreted by health agencies in ways that may significantly affect our business and our products. It is impossible to predict whether further legislative changes will be enacted, or whether regulations, guidance, or interpretations will change, and what the impact of such changes, if any, may be. For example, the Patient Protection and Affordable Care Act and the Health Care and Education Affordability Reconciliation Act of 2010 (collectively the “ACA”), enacted in March 2010, substantially changed the way healthcare is financed by both governmental and private insurers, and significantly impacted the pharmaceutical industry. With regard to pharmaceutical products, among other things, ACA is expected to expand, increase, and change the methodology regarding industry rebates for drugs covered under Medicaid programs; impose an annual, nondeductible fee on any entity that manufactures or imports specific branded prescription drugs and biologic agents, apportioned among those entities

according to market share in certain government healthcare programs; expand eligibility criteria for Medicaid programs by, among other things, allowing states to offer Medicaid coverage to certain individuals with income at or below 133% of the federal poverty level; expand the entities eligible for discounts under the Public Health Service pharmaceutical pricing program; create a new Patient Centered Outcomes Research Institute to oversee, identify priorities in, and conduct comparative clinical effectiveness research, along with funding for such research; and make changes to the coverage requirements under the Medicare D program. Significant legislative changes to the ACA also appear possible in the 115th U.S. Congress under the Trump Administration.

We expect both government and private health plans to continue to require healthcare providers, including healthcare providers that may one day purchase our products, to contain costs and demonstrate the value of the therapies they provide. Even if our product candidates are approved, the commercial success of our products will depend substantially on the extent to which they are covered by third-party payors, including government health authorities and private health insurers. In the United States, no uniform policy of coverage and reimbursement for products exists among third-party payors, and coverage and reimbursement for products can differ significantly from payor to payor. If coverage and reimbursement are not available, or reimbursement is available only to limited levels, we or our collaborators may not be able to successfully commercialize our product candidates.

New data from our research and development activities, and/or resource considerations could modify our strategy and result in the need to adjust our projections of timelines and costs of programs.

Because we are focused on novel technologies, our research and development activities, including our nonclinical studies and clinical trials, involve the ongoing discovery of new facts and the generation of new data, based on which we determine next steps for a relevant program. These developments can occur with varying frequency and constitute the basis on which our business is conducted. We make determinations on an ongoing basis as to which of these facts or data will influence timelines and costs of programs. We may not always be able to make such judgments accurately, which may increase the costs we incur attempting to commercialize our product candidates. We monitor the likelihood of success of our initiatives and we may need to discontinue funding of such activities if they do not prove to be commercially feasible, due to our limited resources.

We may need to successfully address a number of technological challenges in order to complete development of our product candidates. Moreover, these product candidates may not be effective in treating any disease or may prove to have undesirable or unintended side effects, toxicities, or other characteristics that may preclude our obtaining regulatory approvals or prevent or limit commercial use.

Risks Related to Intellectual Property Rights

If we are unable to obtain and enforce patent protection for our product candidates and related technology, our business could be materially harmed.

We rely upon a combination of patents, trade secret protection and confidentiality agreements to protect the intellectual property related to our product candidates and technology. Any disclosure to or misappropriation by third parties of our confidential proprietary information could enable competitors to duplicate or surpass our technological achievements, eroding our competitive position in the market. Our patent applications may not result in issued patents, and, even if issued, the patents may be challenged and invalidated. Moreover, our patents and patent applications may not be sufficiently broad to prevent others from practicing our technologies or developing competing products. We also face the risk that others may independently develop similar or alternative technologies or may design around our proprietary property.

Issued patents may be challenged, narrowed, invalidated or circumvented. In addition, court decisions may introduce uncertainty in the enforceability or scope of patents owned by biotechnology companies. The legal systems of certain countries do not favor the aggressive enforcement of patents, and the laws of foreign countries may not allow us to

protect our inventions with patents to the same extent as the laws of the United States. Because patent applications in the United States and many foreign jurisdictions are typically not published until 18 months after filing, or in some cases not at all, and because publications of discoveries in scientific literature lag behind actual discoveries, we cannot be certain that we were the first to make the inventions claimed in our issued patents or pending patent applications, or that we were the first to file for protection of the inventions set forth in our patents or patent applications. As a result, we may not be able to obtain or maintain protection for certain inventions. Therefore, the enforceability and scope of our patents in the United States and in foreign countries cannot be predicted with certainty and, as a result, any patents that we own, or license may not provide sufficient protection against competitors. We may not be able to obtain or maintain patent protection from our pending patent applications, from those we may file in the future, or from those we may license from third parties. Moreover, even if we are able to obtain patent protection, such patent protection may be of insufficient scope to achieve our business objectives.

Patent terms may be inadequate to protect our competitive position on our product candidates for an adequate amount of time. Patents have a limited lifespan. In the United States, the natural expiration of a patent is generally 20 years after its effective filing date. Various extensions may be available; however, the life of a patent, and the protection it affords, is limited. Without patent protection for our product candidates, we may be open to competition from biosimilar or generic versions of our product candidates. Furthermore, the product development timeline for biotechnology products is lengthy and it is possible that our issued patents covering our product candidates in the United States and other jurisdictions may expire prior to commercial launch. For example, if we encounter delays in our development efforts, including our clinical trials, the period of time during which we could market our product candidates under patent protection could be reduced.

Our strategy depends on our ability to identify and seek patent protection for our discoveries. This process is expensive and time consuming, and we and our current or future licensors or licensees may not be able to file and prosecute all necessary or desirable patent applications at a reasonable cost or in a timely manner or in all jurisdictions where protection may be commercially advantageous. It is also possible that we or our current licensors or licensees, or any future licensors or licensees, may not identify patentable aspects of inventions made in the course of development and commercialization activities in time to obtain patent protection on them. Therefore, these and any of our patents and applications may not be prosecuted and enforced in a manner consistent with the best interests of our business. Defects of form in the preparation or filing of our patents or patent applications may exist, or may arise in the future, for example with respect to proper priority claims, inventorship, etc. If we or our current licensors or licensees, or any future licensors or licensees, fail to establish, maintain or protect such patents and other intellectual property rights, such rights may be reduced or eliminated. If our current licensors or licensees, or any future licensors or licensees, are not fully cooperative or disagree with us as to the prosecution, maintenance or enforcement of any patent rights, such patent rights could be compromised. If there are material defects in the form or preparation of our patents or patent applications, such patents or applications may be invalid and unenforceable. Despite our efforts to protect our proprietary rights, unauthorized parties may be able to obtain and use information that we regard as proprietary. The issuance of a patent does not ensure that it is valid or enforceable, so even if we obtain patents, they may not be valid or enforceable against third parties. In addition, the issuance of a patent does not give us the right to practice the patented invention. Third parties may have blocking patents that could prevent us from marketing our own patented product and practicing our own patented technology. Any of these outcomes could impair our ability to prevent competition from third parties, which may have an adverse impact on our business.

The patent landscapes in the fields of antibody, vaccine, adjuvant and adoptive cell therapy development, manufacture and commercialization are crowded. For example, we are aware of third party patents directed to methods for identifying and producing therapeutic products such as antibodies, vaccines, adjuvants and adoptive cell therapies. We are also aware of third party patents directed to products targeting numerous antigens for which we also seek to identify, develop, and commercialize products. For example, some patents claim products based on competitive binding with existing products, some claim products based on specifying sequence or other structural information, and some claim various methods of discovery, production, or use of such products.

These or other third-party patents could impact our freedom to operate in relation to our technology platforms, as well as in relation to development and commercialization of products identified by us as therapeutic candidates. As we discover and develop our candidates, we will continue to conduct analyses of these third-party patents to determine whether we believe we might infringe them, and if so, whether they would be likely to be deemed valid and enforceable if challenged. If we determine that a license for a given patent or family of patents is necessary or desirable, there can be no guarantee that a license would be available on favorable terms, or at all. Inability to obtain a license on favorable terms, should such a license be determined to be necessary or desirable, could, without limitation, result in increased costs to design around the third-party patents, delay product launch, or result in cancellation of the affected program or cessation of use of the affected technology.

Third parties may also seek to market biosimilar versions of any approved products. Alternatively, third parties may seek approval to market their own products similar to or otherwise competitive with our products. In these

circumstances, we may need to defend and/or assert our patents, including by filing lawsuits alleging patent infringement. In any of these types of proceedings, a court or agency with jurisdiction may find our patents invalid and/or unenforceable. Even if we have valid and enforceable patents, these patents still may not provide protection against competing products or processes sufficient to achieve our business objectives.

We own, co-own or have exclusive rights to approximately 25 issued United States patents and approximately 75 issued foreign patents. We also own, co-own or have exclusive rights to approximately 35 pending United States patent applications and approximately 180 pending foreign patent applications. However, our patents may not protect us against our competitors. Our patent positions, and those of other biopharmaceutical, pharmaceutical and biotechnology companies, are generally uncertain and involve complex legal, scientific, and factual questions. The standards which the United States Patent and Trademark Office (“USPTO”) uses to grant patents, and the standards which courts use to interpret patents, are not always applied predictably or uniformly and can change, particularly as new technologies develop. Consequently, the level of protection, if any, that will be provided by our patents if we attempt to enforce them and they are challenged, is uncertain. In addition, the type and extent of patent claims that will be issued to us in the future is uncertain. Any patents that are issued may not contain claims that permit us to stop competitors from using similar technology.

Through our acquisitions of 4-AB, PhosImmune and certain assets of Celexion, we own, co-own, or have exclusive rights to a number of patents and patent applications directed to various methods and compositions, including methods for identifying therapeutic antibodies and product candidates arising out of such entities' technology platforms. In particular, we own patents and patent applications relating to our Retrocyte Display™ technology platform, a high throughput antibody expression platform for the identification of fully-human and humanized monoclonal antibodies. This patent family is projected to expire between 2029 and 2031. Through our acquisition of PhosImmune, we own, co-own, or have exclusive rights to patents and patent applications directed to various methods and compositions, including a patent directed to methods for identifying phosphorylated proteins using mass spectrometry. This patent is projected to expire in 2023. We also own patents and patent applications relating to the SECANT® platform, a platform used for the generation of novel monoclonal antibodies. This patent family is projected to expire between 2028 and 2029. In addition, as we advance our research and development efforts with our institutional and corporate collaborators, we are seeking patent protection for newly identified therapeutic antibodies and product candidates. We can provide no assurance that any of our patents, including the patents that we acquired or in-licensed in connection with our acquisitions of 4-AB, PhosImmune and certain assets of Celexion, will have commercial value, or that any of our existing or future patent applications, including the patent applications that we acquired or in-licensed in connection with our acquisitions of 4-AB, PhosImmune and certain assets of Celexion, will result in the issuance of valid and enforceable patents.

Our issued patents covering Prophage vaccine and methods of use thereof, alone or in combination with other agents, expired or will expire at various dates between 2015 and 2024. In particular, our issued U.S. patents covering Prophage composition of matter expired in 2015. In addition, our issued patents covering QS-21 Stimulon composition of matter expired in 2008. We continue to explore means of extending the life cycle of our patent portfolio.

The patent position of biopharmaceutical, pharmaceutical or biotechnology companies, including ours, is generally uncertain and involves complex legal and factual considerations. The standards which the USPTO and its foreign counterparts use to grant patents are not always applied predictably or uniformly and can change. There is also no uniform, worldwide policy regarding the subject matter and scope of claims granted or allowable in biopharmaceutical, pharmaceutical or biotechnology patents. The laws of some foreign countries do not protect proprietary information to the same extent as the laws of the United States, and many companies have encountered significant problems and costs in protecting their proprietary information in these foreign countries. Outside the United States, patent protection must be sought in individual jurisdictions, further adding to the cost and uncertainty of obtaining adequate patent protection outside of the United States. Accordingly, we cannot predict whether additional patents protecting our technology will issue in the United States or in foreign jurisdictions, or whether any patents that do issue will have claims of adequate scope to provide competitive advantage. Moreover, we cannot predict whether third parties will be able to successfully obtain claims or the breadth of such claims. The allowance of broader claims may increase the incidence and cost of patent interference proceedings, opposition proceedings, post-grant review, inter partes review, and/or reexamination proceedings, the risk of infringement litigation, and the vulnerability of the claims to challenge. On the other hand, the allowance of narrower claims does not eliminate the potential for adversarial proceedings and may fail to provide a competitive advantage. Our issued patents may not contain claims sufficiently broad to protect us against third parties with similar technologies or products or provide us with any competitive advantage.

We may become involved in lawsuits to protect or enforce our patents, which could be expensive, time consuming and unsuccessful.

Third parties may infringe or misappropriate our intellectual property, including our existing patents, patents that may issue to us in the future, or the patents of our licensors or licensees to which we have a license. As a result, we may be required to file infringement claims to stop third-party infringement or unauthorized use. Further, we may not be able to prevent, alone or with our licensors or licensees, misappropriation of our intellectual property rights, particularly in countries where the laws may not protect those rights as fully as in the United States.

If we or one of our licensors or licensees were to initiate legal proceedings against a third party to enforce a patent covering our product candidates, the defendant could counterclaim that the patent covering our product candidates is invalid and/or unenforceable. In patent litigation in the United States, defendant counterclaims alleging invalidity and/or unenforceability are commonplace, and there are numerous grounds upon which a third party can assert invalidity or unenforceability of a patent.

In addition, within and outside of the United States, there has been a substantial amount of litigation and administrative proceedings, including interference and reexamination proceedings before the USPTO or oppositions and other comparable proceedings in various foreign jurisdictions, regarding patent and other intellectual property rights in the biopharmaceutical industry. Notably, the Leahy-Smith America Invents Act, or the American Invents Act (“AIA”), introduced new procedures, including inter partes review and post grant review. These procedures may be used by competitors to challenge the scope and/or validity of our patents, including those patents perceived by our competitors as blocking entry into the market for their products, and the outcome of such challenges.

Even after they have been issued, our patents and any patents which we license may be challenged, narrowed, invalidated or circumvented. If our patents are invalidated or otherwise limited or will expire prior to the commercialization of our product candidates, other companies may be better able to develop products that compete with ours, which could adversely affect our competitive business position, business prospects and financial condition.

The following are non-exclusive examples of litigation and other adversarial proceedings or disputes that we could become a party to involving our patents or patents licensed to us:

- we or our collaborators may initiate litigation or other proceedings against third parties to enforce our patent rights;
- third parties may initiate litigation or other proceedings seeking to invalidate patents owned by or licensed to us or to obtain a declaratory judgment that their product or technology does not infringe our patents or patents licensed to us;
- third parties may initiate opposition proceedings, post-grant review, inter partes review, or reexamination proceedings challenging the validity or scope of our patent rights, requiring us or our collaborators and/or licensors or licensees to participate in such proceedings to defend the validity and scope of our patents;
- there may be a challenge or dispute regarding inventorship or ownership of patents currently identified as being owned by or licensed to us;
- the USPTO may initiate an interference or derivation proceeding between patents or patent applications owned by or licensed to us and those of our competitors, requiring us or our collaborators and/or licensors or licensees to participate in an interference or derivation proceeding to determine the priority of invention, which could jeopardize our patent rights; or
- third parties may seek approval to market biosimilar versions of our future approved products prior to expiration of relevant patents owned by or licensed to us, requiring us to defend our patents, including by filing lawsuits alleging patent infringement.

These lawsuits and proceedings would be costly and could affect our results of operations and divert the attention of our managerial and scientific personnel. There is a risk that a court or administrative body could decide that our patents are invalid or not infringed by a third party's activities, or that the scope of certain issued claims must be further limited. An adverse outcome in a litigation or proceeding involving our own patents could limit our ability to assert our patents against these or other competitors, affect our ability to receive royalties or other licensing consideration from our licensees, and may curtail or preclude our ability to exclude third parties from making, using and selling similar or competitive products. An adverse outcome may also put our pending patent applications at risk of not issuing, or issuing with limited and potentially inadequate scope to cover our product candidates. The outcome following legal assertions of invalidity and unenforceability is unpredictable. With respect to the validity question, for example, we cannot be certain that there is no invalidating prior art, of which we and the patent examiner were unaware during prosecution. Additionally, it is also possible that prior art of which we are aware, but which we do not believe affects the validity or enforceability of a claim, may, nonetheless, ultimately be found by a court of law or an administrative panel to affect the validity or enforceability of a claim, for example, if a priority claim is found to be improper. If a defendant were to prevail on a legal assertion of invalidity and/or unenforceability, we could lose at least part, and perhaps all, of the patent protection on our relevant product candidates. Such a loss of patent protection could have a material adverse impact on our business.

Furthermore, because of the substantial amount of discovery required in connection with intellectual property litigation or administrative proceedings, there is a risk that some of our confidential information could be compromised by disclosure. In addition, during the course of litigation or administrative proceedings, there could be public announcements of the results of hearings, motions or other interim proceedings or developments or public access to related documents. If investors perceive these results to be negative, the market price for our common stock could be significantly harmed. Any of these occurrences could adversely affect our competitive business position, business prospects, and financial condition.

Intellectual property rights do not necessarily address all potential threats to our competitive advantage. The degree of future protection for our proprietary rights is uncertain because legal means afford only limited protection and may not adequately protect our rights or permit us to gain or keep our competitive advantage. For example:

- others may be able to develop a platform that is similar to, or better than, ours in a way that is not covered by the claims of our patents;
- others may be able to make compounds that are similar to our product candidates but that are not covered by the claims of our patents;
- we might not have been the first to make the inventions covered by patents or pending patent applications;
- we might not have been the first to file patent applications for these inventions;

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- any patents that we obtain may not provide us with any competitive advantages or may ultimately be found invalid or unenforceable; or
- we may not develop additional proprietary technologies that are patentable.

Our commercial success depends significantly on our ability to operate without infringing the patents and other proprietary rights of third parties.

Our success will depend in part on our ability to operate without infringing the proprietary rights of third parties. Other entities may have or obtain patents or proprietary rights that could limit our ability to make, use, sell, offer for sale or import our future approved products or impair our competitive position. In particular, the patent landscapes around the discovery, development, manufacture and commercial use of our product candidates are crowded.

Third parties may have or obtain valid and enforceable patents or proprietary rights that could block us from developing product candidates using our technology. Our failure to obtain a license to any technology that we require may materially harm our business, financial condition and results of operations. Moreover, our failure to maintain a license to any technology that we require may also materially harm our business, financial condition, and results of operations. Furthermore, we would be exposed to a threat of litigation.

In the biopharmaceutical industry, significant litigation and other proceedings regarding patents, patent applications, trademarks and other intellectual property rights have become commonplace. The types of situations in which we may become a party to such litigation or proceedings include:

- we or our collaborators may initiate litigation or other proceedings against third parties seeking to invalidate the patents held by those third parties or to obtain a judgment that our products or processes do not infringe those third parties' patents;
- if our competitors file patent applications that claim technology also claimed by us or our licensors or licensees, we or our licensors or licensees may be required to participate in interference, derivation or other proceedings to determine the priority of invention, which could jeopardize our patent rights and potentially provide a third party with a dominant patent position;
- if third parties initiate litigation claiming that our processes or products infringe their patent or other intellectual property rights, we and our collaborators will need to defend against such proceedings; and
- if a license to necessary technology is terminated, the licensor may initiate litigation claiming that our processes or products infringe or misappropriate their patent or other intellectual property rights and/or that we breached our obligations under the license agreement, and we and our collaborators would need to defend against such proceedings.

These lawsuits would be costly and could affect our results of operations and divert the attention of our management and scientific personnel. There is a risk that a court would decide that we or our collaborators are infringing the third party's patents and would order us or our collaborators to stop the activities covered by the patents. In that event, we or our collaborators may not have a viable alternative to the technology protected by the patent and may need to halt work on the affected product candidate or cease commercialization of an approved product. In addition, there is a risk that a court will order us or our collaborators to pay the other party damages. An adverse outcome in any litigation or other proceeding could subject us to significant liabilities to third parties and require us to cease using the technology that is at issue or to license the technology from third parties. We may not be able to obtain any required licenses on commercially acceptable terms or at all. Any of these outcomes could have a material adverse effect on our business.

The biopharmaceutical industry has produced a significant number of patents, and 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 products or 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 invalidity is difficult. For example, in the United States, proving invalidity requires a showing of clear and convincing evidence to overcome the presumption of validity enjoyed by issued patents. Even if we are successful in these

proceedings, we may incur substantial costs and divert management's time and attention in pursuing these proceedings, which could have a material adverse effect on us. If we are unable to avoid infringing the patent rights of others, we may be required to seek a license, defend an infringement action or challenge the validity of the patents in court. Patent litigation is costly and time consuming. We may not have sufficient resources to bring these actions to a successful conclusion. In addition, if we do not obtain a license, develop or obtain non-infringing technology, fail to defend an infringement action successfully or have infringed patents declared invalid, we may incur substantial monetary damages, encounter significant delays in bringing our product candidates to market and be precluded from manufacturing or selling our product candidates.

The cost of any patent litigation or other proceeding, even if resolved in our favor, could be substantial. Some of our competitors may be able to sustain the cost of such litigation and proceedings more effectively than we can because of their substantially greater resources. Uncertainties resulting from the initiation and continuation of patent litigation or other proceedings could have a material adverse effect on our ability to compete in the marketplace. Patent litigation and other proceedings may also absorb significant management time.

If we fail to comply with our obligations under our intellectual property licenses with third parties, we could lose license rights that are important to our business.

We are currently party to various intellectual property license agreements. These license agreements impose, and we expect that future license agreements may impose, various diligence, milestone payment, royalty, insurance and other obligations on us. These licenses typically include an obligation to pay an upfront payment, yearly maintenance payments and royalties on sales. If we fail to comply with our obligations under the licenses, the licensors may have the right to terminate their respective license agreements, in which event we might not be able to market any product that is covered by the agreements. Termination of the license agreements or reduction or elimination of our licensed rights may result in our having to negotiate new or reinstated licenses with less favorable terms, which could adversely affect our competitive business position and harm our business.

If we are unable to protect the confidentiality of our proprietary information, the value of our technology and products could be adversely affected.

In addition to patent protection, we also rely on other proprietary rights, including protection of trade secrets, and other proprietary information. To maintain the confidentiality of trade secrets and proprietary information, we enter into confidentiality agreements with our employees, consultants, collaborators and others upon the commencement of their relationships with us. These agreements require that all confidential information developed by the individual or made known to the individual by us during the course of the individual's relationship with us be kept confidential and not disclosed to third parties. Our agreements with employees and our personnel policies also provide that any inventions conceived by the individual in the course of rendering services to us shall be our exclusive property. However, we may not obtain these agreements in all circumstances, and individuals with whom we have these agreements may not comply with their terms. Thus, despite such agreement, such inventions may become assigned to third parties. In the event of unauthorized use or disclosure of our trade secrets or proprietary information, these agreements, even if obtained, may not provide meaningful protection, particularly for our trade secrets or other confidential information. To the extent that our employees, consultants or contractors use technology or know-how owned by third parties in their work for us, disputes may arise between us and those third parties as to the rights in related inventions. To the extent that an individual who is not obligated to assign rights in intellectual property to us is rightfully an inventor of intellectual property, we may need to obtain an assignment or a license to that intellectual property from that individual, or a third party or from that individual's assignee. Such assignment or license may not be available on commercially reasonable terms or at all.

Adequate remedies may not exist in the event of unauthorized use or disclosure of our proprietary information. The disclosure of our trade secrets would impair our competitive position and may materially harm our business, financial condition and results of operations. Costly and time-consuming litigation could be necessary to enforce and determine the scope of our proprietary rights, and failure to maintain trade secret protection could adversely affect our competitive business position. In addition, others may independently discover or develop our trade secrets and proprietary information, and the existence of our own trade secrets affords no protection against such independent discovery.

As is common in the biopharmaceutical industry, we employ individuals who were previously or concurrently employed at research institutions and/or other biopharmaceutical, biotechnology or pharmaceutical companies, including our competitors or potential competitors. We may be subject to claims that these employees, or we, have inadvertently or otherwise used or disclosed trade secrets or other proprietary information of their former employers,

or that patents and applications we have filed to protect inventions of these employees, even those related to one or more of our product candidates, are rightfully owned by their former or concurrent employer. Litigation may be necessary to defend against these claims. Even if we are successful in defending against these claims, litigation could result in substantial costs and be a distraction to management.

Obtaining and maintaining our patent protection depends on compliance with various procedural, documentary, fee payment and other requirements imposed by governmental patent agencies, and our patent protection could be reduced or eliminated for non-compliance with these requirements.

Periodic maintenance fees, renewal fees, annuity fees and various other governmental fees on patents and/or applications will be due to the USPTO and various foreign patent offices at various points over the lifetime of our patents and/or applications. We have systems in place to remind us to pay these fees, and we rely on our outside counsel or service providers to pay these fees when due. Additionally, the USPTO and various foreign patent offices require compliance with a number of procedural, documentary, fee payment and other similar provisions during the patent application process. We employ reputable law firms and other professionals to

help us comply, and in many cases, an inadvertent lapse can be cured by payment of a late fee or by other means in accordance with rules applicable to the particular jurisdiction. However, there are situations in which noncompliance can result in abandonment or lapse of the patent or patent application, resulting in partial or complete loss of patent rights in the relevant jurisdiction. If such an event were to occur, it could have a material adverse effect on our business. In addition, we are responsible for the payment of patent fees for patent rights that we have licensed from other parties.

If any licensor of these patents does not itself elect to make these payments, and we fail to do so, we may be liable to the licensor for any costs and consequences of any resulting loss of patent rights.

Changes in U.S. patent law could diminish the value of patents in general, thereby impairing our ability to protect our product candidates.

Obtaining and enforcing patents in the biopharmaceutical industry involves both technological and legal complexity, and therefore, is costly, time-consuming and inherently uncertain. In addition, the United States has enacted and implemented wide-ranging patent reform legislation. Further, recent U.S. Supreme Court rulings have either narrowed the scope of patent protection available in certain circumstances or weakened the rights of patent owners in certain situations. In addition to increasing uncertainty with regard to our ability to obtain patents in the future, this combination of events has created uncertainty with respect to the value of patents, once obtained.

For our U.S. patent applications containing a claim not entitled to priority before March 16, 2013, there is a greater level of uncertainty in the patent law. In September 2011, AIA was signed into law. The AIA includes a number of significant changes to U.S. patent law, including provisions that affect the way patent applications are prosecuted and also affect patent litigation. The USPTO has developed regulations and procedures to govern administration of the AIA, and many of the substantive changes to patent law associated with the AIA. It is not clear what other, if any, impact the AIA will have on the operation of our business. Moreover, the AIA and its implementation 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.

An important change introduced by the AIA is that, as of March 16, 2013, the United States transitioned to a “first-inventor-to- file” system for deciding which party should be granted a patent when two or more patent applications are filed by different parties claiming the same invention. A third party that files a patent application in the USPTO after that date but before us could therefore be awarded a patent covering an invention of ours even if we had made the invention before it was made by the third party. This requires us to be cognizant going forward of the time from invention to filing of a patent application. Furthermore, our ability to obtain and maintain valid and enforceable patents depends on whether the differences between our technology and the prior art allow our technology to be patentable over the prior art. Since patent applications in the United States and most other countries are confidential for a period of time after filing, we cannot be certain that we were the first to either (i) file any patent application related to our product candidates or (ii) invent any of the inventions claimed in our patents or patent applications.

Among some of the other changes introduced by the AIA are changes that limit where a patentee may file a patent infringement suit and providing opportunities for third parties to challenge any issued patent in the USPTO. This applies to all of our U.S. patents, even those issued before March 16, 2013. Because of a lower evidentiary standard in USPTO proceedings compared to the evidentiary standard in United States federal court necessary to invalidate a patent claim, a third party could potentially provide evidence in a USPTO proceeding sufficient for the USPTO to hold a claim invalid even though the same evidence would be insufficient to invalidate the claim if first presented in a district court action. Accordingly, a third party may attempt to use the USPTO procedures to invalidate our patent claims that would not have been invalidated if first challenged by the third party as a defendant in a district court action.

We may be subject to claims that our employees, consultants or independent contractors have wrongfully used or disclosed confidential information of third parties.

We may have received confidential and proprietary information from third parties. In addition, we employ individuals who were previously employed at other biopharmaceutical, biotechnology or pharmaceutical companies. We may be subject to claims that we or our employees, consultants or independent contractors have inadvertently or otherwise improperly used or disclosed confidential information of these third parties or our employees' former employers. Further, we may be subject to ownership disputes in the future arising, for example, from conflicting obligations of consultants or others who are involved in developing our product candidates. We may also be subject to claims that former employees, consultants, independent contractors, collaborators or other third parties have an ownership interest in our patents or other intellectual property. Litigation may be necessary to defend against these and other claims challenging our right to and use of confidential and proprietary information. If we fail in defending any such claims, in addition to paying monetary damages, we may lose our rights therein. Such an outcome could have a material adverse effect on our business. Even if we are successful in defending against these claims, litigation could result in substantial cost and be a distraction to our management and employees.

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

Filing, prosecuting and defending patents on our product candidates in all countries throughout the world would be prohibitively expensive. The requirements for patentability may differ in certain countries, particularly developing countries. For example, China has a heightened requirement for patentability, and specifically requires a detailed description of medical uses of a claimed drug. In addition, the laws of some foreign countries do not protect intellectual property rights to the same extent as laws in the United States. Consequently, we may not be able to prevent third parties from practicing our inventions in all countries outside the United States. Competitors may use our technologies in jurisdictions where we have not obtained patent protection to develop their own products and, further, may export otherwise infringing products to territories where we have patent protection, but enforcement on infringing activities is inadequate. These products may compete with our product candidates, and our patents or other intellectual property rights may not be effective or sufficient to prevent them from 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 to stop the infringement of our patents or marketing of competing products in violation of our proprietary rights generally. Proceedings to enforce our patent rights in foreign jurisdictions could result in substantial costs and divert our efforts and attention from other aspects of our business, could put our patents at risk of being invalidated or interpreted narrowly and our patent applications at risk of not issuing, and could provoke third parties to assert claims against us. We may not prevail in any lawsuits that we initiate and the damages or other remedies awarded, if any, may not be commercially meaningful. In addition, certain countries in Europe and certain developing countries, including India and China, have compulsory licensing laws under which a patent owner may be compelled to grant licenses to third parties. In those countries, we may have limited remedies if our patents are infringed or if we are compelled to grant a license to our patents to a third party, which could materially diminish the value of those patents. This could limit our potential revenue opportunities. Accordingly, our efforts to enforce our intellectual property rights around the world may be inadequate to obtain a significant commercial advantage from the intellectual property that we own or license. Finally, our ability to protect and enforce our intellectual property rights may be adversely affected by unforeseen changes in foreign intellectual property laws.

Risks Related to Litigation

We may face litigation or regulatory investigations that could result in substantial damages and may divert management's time and attention from our business.

From time to time we may become a party to legal proceedings, claims and investigations that arise in the ordinary course of business such as, but not limited to, patent, employment, securities, commercial and environmental matters. While we currently believe that the ultimate outcome of any of these proceedings will not have a material adverse effect on our financial position, results of operations, or liquidity, litigation is subject to inherent uncertainty. Furthermore, litigation and regulatory investigations consume both cash and management attention.

We maintain property and general commercial insurance coverage as well as errors and omissions insurance policies. This insurance coverage may not be sufficient to cover us for all potential claims or a claim may be made for which we are not covered by insurance, in which case the damages could have a material and adverse effect on the business.

If we or our employees fail to comply with laws or regulations, it could adversely impact our reputation, business and stock price.

We are exposed to the risk of employee fraud or other misconduct. Misconduct by employees could include intentional and/or negligent failures to comply with FDA regulations, to provide accurate information to the FDA, to comply with manufacturing standards we have established, to comply with federal and state health care fraud and

abuse, transparency, and/or data privacy and security laws and regulations, to report financial information or data accurately or to disclose unauthorized activities to us. In particular, sales, marketing and business arrangements in the healthcare industry are subject to extensive laws and regulations intended to prevent fraud, kickbacks, self-dealing and other abusive practices; to promote transparency; and to protect the privacy and security of patient data. These laws and regulations may restrict or prohibit a wide range of pricing, discounting, marketing and promotion, sales commission, customer incentive programs and other business arrangements.

While we have adopted a corporate compliance program, we may not be able to protect against all potential issues of noncompliance. Efforts to ensure that our business complies with all 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 laws and regulations.

Employee misconduct could also involve the improper use or disclosure of information obtained in the course of clinical trials, which could result in regulatory sanctions and serious harm to our reputation. In addition, during the course of our operations, our directors, executives and employees may have access to material, nonpublic information regarding our business, our results of operations or potential transactions we are considering. We may not be able to prevent a director, executive or employee from trading in our common stock on the basis of, or while having access to, material, nonpublic information. If a director, executive or employee was to be investigated, or an action was to be brought against a director, executive or employee for insider trading, it could have a negative impact on our reputation and our stock price. Such a claim, with or without merit, could also result in substantial expenditures of time and money, and divert the attention of our management team.

Product liability and other claims against us may reduce demand for our products and/or result in substantial damages.

We face an inherent risk of product liability exposure related to testing our product candidates in human clinical trials and manufacturing antibodies in our Berkeley, CA facility and may face even greater risks if we ever sell products commercially. An individual may bring a product liability claim against us if one of our product candidates causes, or merely appears to have caused, an injury. Product liability claims may result in:

- regulatory investigations;
- injury to our reputation;
- withdrawal of clinical trial volunteers;
- costs of related litigation;
- substantial monetary awards to plaintiffs; and
- decreased demand for any future products.

We manufacture the Prophage vaccines from a patient's cancer cells, and medical professionals must inject the vaccines into the same patient from which they were manufactured. A patient may sue us if a hospital, a shipping company, or we fail to receive the removed cancer tissue or deliver that patient's vaccine. We do not have any other insurance that covers loss of or damage to the Prophage vaccines or tumor material, and we do not know whether such insurance will be available to us at a reasonable price or at all. We have limited product liability coverage for use of our product candidates. Our product liability policy provides \$10.0 million aggregate coverage and \$10.0 million per occurrence coverage. This limited insurance coverage may be insufficient to fully cover us for future claims.

We are also subject to laws generally applicable to businesses, including but not limited to, federal, state and local wage and hour, employee classification, mandatory healthcare benefits, unlawful workplace discrimination and whistle-blowing. Any actual or alleged failure to comply with any regulation applicable to our business or any whistle-blowing claim, even if without merit, could result in costly litigation, regulatory action or otherwise harm our business, results of operations, financial condition, cash flow and future prospects.

If we do not comply with environmental laws and regulations, we may incur significant costs and potential disruption to our business.

We use or may use hazardous, infectious, and radioactive materials, and recombinant DNA in our operations, which have the potential of being harmful to human health and safety or the environment. We store these hazardous (flammable, corrosive, toxic), infectious, and radioactive materials, and various wastes resulting from their use, at our facilities pending use and ultimate disposal. We are subject to a variety of federal, state, and local laws and regulations governing use, generation, storage, handling, and disposal of these materials. We may incur significant costs complying with both current and future environmental health and safety laws and regulations. In particular, we are subject to regulation by the Occupational Safety and Health Administration, the Environmental Protection Agency, the Drug Enforcement Agency, the Department of Transportation, the Centers for Disease Control and Prevention, the National Institutes of Health, the International Air Transportation Association, and various state and local agencies. At any time, one or more of the aforementioned agencies could adopt regulations that may affect our operations. We are also subject to regulation under the Toxic Substances Control Act and the Resource Conservation Development

programs.

Although we believe that our current procedures and programs for handling, storage, and disposal of these materials comply with federal, state, and local laws and regulations, we cannot eliminate the risk of accidents involving contamination from these materials. Although we have a workers' compensation liability policy, we could be held liable for resulting damages in the event of an accident or accidental release, and such damages could be substantially in excess of any available insurance coverage and could substantially disrupt our business.

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Risks Related to our Common Stock

Provisions in our organizational documents could prevent or frustrate attempts by stockholders to replace our current management.

Our certificate of incorporation and bylaws contain provisions that could make it more difficult for a third party to acquire us without the consent of our Board of Directors. Our certificate of incorporation provides for a staggered board and removal of directors only for cause. Accordingly, stockholders may elect only a minority of our Board at any annual meeting, which may have the effect of delaying or preventing changes in management. In addition, under our certificate of incorporation, our Board of Directors may issue additional shares of preferred stock and determine the terms of those shares of stock without any further action by our stockholders. Our issuance of additional preferred stock could make it more difficult for a third party to acquire a majority of our outstanding voting stock and thereby effect a change in the composition of our Board of Directors. Our certificate of incorporation also provides that our stockholders may not take action by written consent. Our bylaws require advance notice of stockholder proposals and director nominations and permit only our president or a majority of the Board of Directors to call a special stockholder meeting. These provisions may have the effect of preventing or hindering attempts by our stockholders to replace our current management. In addition, Delaware law prohibits a corporation from engaging in a business combination with any holder of 15% or more of its capital stock until the holder has held the stock for three years unless, among other possibilities, the board of directors approves the transaction. Our Board of Directors may use this provision to prevent changes in our management. Also, under applicable Delaware law, our Board of Directors may adopt additional anti-takeover measures in the future.

Our stock has historically had low trading volume, and its public trading price has been volatile.

During the period from our initial public offering on February 4, 2000 to December 31, 2018, and the year ended December 31, 2018, the closing price of our common stock has fluctuated between \$1.59 (or \$0.27 pre-reverse stock split) and \$315.78 (or \$52.63 pre-reverse stock split) per share and \$1.59 and \$6.04 per share, respectively. The average daily trading volume for the year ended December 31, 2018 was approximately 1,538,510 shares, while the average daily trading volume for the year ended December 31, 2017 was approximately 1,174,002. The market may experience significant price and volume fluctuations that are often unrelated to the operating performance of individual companies. In addition to general market volatility, many factors may have a significant adverse effect on the market price of our stock, including:

- continuing operating losses, which we expect over the next several years as we continue our development activities;
- announcements of decisions made by public officials or delays in any such announcements;
- results of our pre-clinical studies and clinical trials or delays in anticipated timing;
- delays in our regulatory filings or those of our partners;
- announcements of new collaboration agreements with strategic partners or developments by our existing collaboration partners;
- announcements of acquisitions;
- announcements of technological innovations, new commercial products, failures of products, or progress toward commercialization by our competitors or peers;
- failure to realize the anticipated benefits of acquisitions;
- developments concerning proprietary rights, including patent and litigation matters;
- publicity regarding actual or potential results with respect to product candidates under development;
 - quarterly fluctuations in our financial results, including our average monthly cash used in operating activities;
- variations in the level of expenses related to any of our product candidates or clinical development programs;
- additions or departures of key management or scientific personnel;
- conditions or trends in the biopharmaceutical, biotechnology and pharmaceutical industries generally;
-

other events or factors, including those resulting from war, incidents of terrorism, natural disasters or responses to these events;

• changes in accounting principles;

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general economic and market conditions and other factors that may be unrelated to our operating performance or the operating performance of our competitors, including changes in market valuations of similar companies; and sales of common stock by us or our stockholders in the future, as well as the overall trading volume of our common stock.

In the past, securities class action litigation has often been brought against a company following a significant decline in the market price of its securities. This risk is especially relevant for us because many biopharmaceutical, biotechnology and pharmaceutical companies experience significant stock price volatility.

The trading market for our common stock will depend in part on the research and reports that securities or industry analysts publish about us or our business. If one or more of the analysts who covers us downgrades our stock, or publishes inaccurate or unfavorable research about our business, our stock price would likely decline. If one or more of these analysts ceases coverage of us or fails to publish reports on us regularly, demand for our stock could decrease, which could cause our stock price and trading volume to decline.

The sale of a significant number of shares could cause the market price of our stock to decline.

The sale by us or the resale by stockholders of a significant number of shares of our common stock could cause the market price of our common stock to decline. As of March 11, 2019, we had 134,205,374 shares of common stock outstanding. All of these shares are eligible for sale on Nasdaq, although certain of the shares are subject to sales volume and other limitations. We have filed registration statements to permit the sale of approximately 31,200,000 shares of common stock under our equity incentive plans, and to permit the sale of 1,500,000 shares of common stock under our 2015 Inducement Equity Plan. We have also filed registration statements to permit the sale of approximately 167,000 shares of common stock under our Employee Stock Purchase Plan, to permit the sale of 425,000 shares of common stock under our Directors' Deferred Compensation Plan, to permit the sale of approximately 31,100,319 shares of common stock pursuant to various private placement agreements and to permit the sale of up to 50,000,000 shares of our common stock pursuant to our At Market Issuance Sales Agreement. As of the date of filing, an aggregate of approximately 63,749,000 of these shares remained available for sale. In October 2018, we completed a private placement of 18,459 shares of Series C-1 convertible preferred stock, convertible into 18,459,000 shares of common stock. The resale of all 18,459,000 shares of common stock underlying the 18,459 shares of Series C-1 convertible preferred stock was registered with the SEC pursuant to a Registration Statement on Form S-3 filed with the SEC on November 8, 2018 and declared effective on December 10, 2018. As part of our collaboration with Gilead, we completed a private placement of 11,111,111 shares of common stock in January 2019, the resale of which must be registered with the SEC by December 2019. In connection with our acquisition of 4-AB in February 2014, we are obligated to make contingent milestone payments to the former shareholders of 4-AB, payable in cash or shares of our common stock at our option, as follows (i) \$10.0 million upon our market capitalization exceeding \$750.0 million for 30 consecutive trading days prior to the earliest of (a) February 12, 2024, (b) the sale of 4-AB or (c) the sale of Agenus and (ii) \$10.0 million upon our market capitalization exceeding \$1.0 billion for 30 consecutive trading days prior to the earliest of (a) February 12, 2024, (b) the sale of 4-AB or (c) the sale of Agenus. In connection with our acquisition of PhosImmune in December 2015, we issued 1,631,521 shares of our common stock to the shareholders of PhosImmune and other third parties having a fair market value of approximately \$7.4 million at closing. In addition, we may be obligated in the future to pay certain contingent milestones payments, payable at our election in cash or shares of our common stock of up to \$35.0 million in the aggregate. If we elect to pay any of these contingent milestones in shares, we are obligated to file registration statements covering any such shares. The market price of our common stock may decrease based on the expectation of such sales.

As of December 31, 2018, warrants to purchase approximately 2,900,000 shares of our common stock with a weighted average exercise price per share of \$4.52 were outstanding.

As of December 31, 2018, options to purchase 18,613,822 shares of our common stock with a weighted average exercise price per share of \$4.15 were outstanding. These options are subject to vesting that occurs over a period of up to four years following the date of grant. As of December 31, 2018, we had 10,083,270 vested options and 2,213,967

non-vested shares outstanding.

As of December 31, 2018, our outstanding shares of Series A-1 Convertible Preferred Stock were convertible into 333,333 shares of our common stock.

As of December 31, 2018, our outstanding shares of Series C-1 Convertible Preferred Stock were convertible into 18,459,000 shares of our common stock. In February 2019, holders of shares of Series C-1 Convertible Preferred Stock converted a portion of such shares into 3,000,000 shares of our common stock.

Any Biotech Electronic Security Tokens (the “Tokens”) we issue will be convertible into common stock in the event AGEN2034 is not approved for commercial sale by the FDA before December 31, 2021, which would dilute our shareholders. If the price per share of our common stock at the time of conversion, based on a trailing weighted average, is \$10 or less, a holder of Tokens

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would be permitted to convert 10 Tokens for 1 share of common stock. If the price per share is above \$10, a holder would be permitted to convert 10 Tokens into a fraction of share of common stock with a value of \$10. The Company will retain the right to pay cash upon conversion, rather than deliver shares.

We may issue additional common stock, preferred stock, restricted stock units, or securities convertible into or exchangeable for our common stock. Furthermore, substantially all shares of common stock for which our outstanding stock options or warrants are exercisable are, once they have been purchased, eligible for immediate sale in the public market. The issuance of additional common stock, preferred stock, restricted stock units, or securities convertible into or exchangeable for our common stock or the exercise of stock options or warrants would dilute existing investors and could adversely affect the price of our securities. In addition, such securities may have rights senior to the rights of securities held by existing investors.

We do not intend to pay cash dividends on our common stock and, consequently your ability to obtain a return on your investment will depend on appreciation in the price of our common stock.

We have never declared or paid any cash dividend on our common stock and do not intend to do so in the foreseeable future. We currently anticipate that we will retain future earnings for the development, operation and expansion of our business. Therefore, the success of an investment in shares of our common stock will depend upon any future appreciation in their value. There is no guarantee that shares of our common stock will appreciate in value or maintain their current value.

Failure to maintain effective internal controls in accordance with Section 404 of the Sarbanes-Oxley Act of 2002 and to comply with changing regulation of corporate governance and public disclosure could have a material adverse effect on our operating results and the price of our common stock.

The Sarbanes-Oxley Act of 2002 and rules adopted by the SEC and Nasdaq have resulted in significant costs to us. In particular, our efforts to comply with Section 404 of the Sarbanes-Oxley Act of 2002 and related regulations regarding the required assessment of our internal control over financial reporting, and our independent registered public accounting firm's audit of internal control over financial reporting, have required commitments of significant management time. We expect these commitments to continue.

Our internal control over financial reporting (as defined in Rules 13a-15 of the Exchange Act) is a process designed to provide reasonable assurance regarding the reliability of financial reporting and the preparation of our consolidated financial statements for external purposes in accordance with U.S. GAAP. Because of its inherent limitations, internal control over financial reporting may not prevent or detect all deficiencies or weaknesses in our financial reporting. While our management has concluded that there were no material weaknesses in our internal control over financial reporting as of December 31, 2018, our procedures are subject to the risk that our controls may become inadequate because of changes in conditions or as a result of a deterioration in compliance with such procedures. No assurance is given that our procedures and processes for detecting weaknesses in our internal control over financial reporting will be effective.

Changing laws, regulations and standards relating to corporate governance and public disclosure, are creating uncertainty for companies. Laws, regulations and standards are subject to varying interpretations in some cases due to their lack of specificity, and as a result, their application in practice may evolve over time as new guidance is provided, which could result in continuing uncertainty regarding compliance matters and higher costs caused by ongoing revisions to disclosure and governance practices. If we fail to comply with these laws, regulations and standards, our reputation may be harmed, and we might be subject to sanctions or investigation by regulatory authorities, such as the SEC. Any such action could adversely affect our operating results and the market price of our common stock.

Risks Related to our Tokens

There is no assurance that we will sell a sufficient number of tokens, if any, to meet our business or financial goals.

In February 2019, we announced the launch of our Tokens, which we intend to issue in accordance with Regulation D of the Securities Act of 1933, as amended (the “Securities Act”) and pursuant to a private placement offering memorandum (the “Offering”). We announced an anticipated closing date in March 2019 and the possibility for us to raise up to a maximum of \$100 million in the Offering. As of the date of this filing, we have not closed on the sale of any Tokens. The Tokens are being offered by us on a “best efforts basis,” meaning that there is no assurance that any or all of the offered Tokens will be sold and we can elect in our discretion not to issue any Tokens for any reason. In addition, we may sell Tokens in multiple rounds, and there can be no assurance that even if we issue tokens in an initial round that we will initiate or complete one or more subsequent rounds.

We intend to use any proceeds of the Offering to fund continued commercial manufacturing, commercialization readiness and clinical development activities focused on combinations of AGEN2034 with other therapies and in indications beyond cervical cancer. If we are unable to raise adequate funds in the Offering, our ability to expand development opportunities for AGEN2034 may be limited. If the Offering does not result in substantial proceeds, it could have a material adverse effect on our ability to fund these objectives and carry out our related business plans. If we were unable to obtain adequate funding from other sources, we would be required to make decisions about which businesses and projects to fund, and we might be required to decrease or eliminate expenditures that we believe would have been advisable.

There is no assurance that purchasers of our Tokens will receive a return on their investment.

Pursuant to the terms of the Offering, each Token will entitle its holder (each, a “Tokenholder”) to receive certain payments following the first commercial sale in the U.S. of AGEN2034, if it receives applicable regulatory approvals. The Tokens are highly speculative and any return on an investment in the Tokens is contingent upon numerous circumstances, many of which (including legal and regulatory conditions) are beyond our control. There is no assurance that purchasers will realize any return on their investments or that their entire investments will not be lost.

If the Company is successful in commercializing AGEN2034, a significant portion of the net sales of such product in the U.S. will be paid to Tokenholders until the Tokenholders are paid the full amount to which they are entitled pursuant to their purchase agreement. As a result, the Company may not receive the full amount of net sales of such product for an extended period of time, if ever.

Following an initial holding period, we intend to transfer the Tokens from a book-entry ledger to the blockchain, which utilizes technologies that are unproven.

Following the holding period required by Rule 144 under the Securities Act for restricted securities, we intend to transfer the record ownership of Tokens from book-entry ledger maintained by a transfer agent to the blockchain. There can be no assurance that we will be able to make such transfer due technical or other limitations, and the ownership of the Tokens may continue to be recorded in a book-entry ledger indefinitely, which could adversely impact their adoption and liquidity.

In the event that the Tokens are transferred to the blockchain, Tokenholders will be relying upon technologies that are new and unproven. The Tokens and their underlying blockchain may not function as intended, or might not be capable of completion, implementation or adoption for many reasons, including technological defects or the inability to scale as contemplated. Any failures of the smart contract to operate as expected may result in unintended transactions that cannot be reversed, and Tokenholders may have more limited remedies than are available in the traditional securities markets. In addition, these technologies are quickly changing and adapting, so the Tokens and their underlying technology could also become outdated or obsolete, particularly if there is a lack of interest in ongoing technological support for the Tokens. Moreover, we have not yet selected which blockchain to utilize, and there could be increased security risk with one blockchain over another, as well as potential vulnerability of some blockchains to a “51% attack” that could result in tampering with the ledger information. There can be no assurance that the selected blockchain will perform as intended once the Tokens are transferred.

We have not identified all the persons that we will need to provide services and functions critical to the maintenance of the Tokens and no assurance can be given that we will be able to engage all necessary persons on acceptable terms, if at all.

We need to identify and recruit additional qualified personnel with backgrounds in developing and distributing blockchain ledger technologies to maintain Tokens. We have not identified all the persons that we will need to engage to provide services and functions critical to maintain the Tokens. We cannot assure that we will be able to engage all such persons with the necessary expertise on the terms acceptable to us, or at all. Further, there can be no assurance

given that if we are able to engage such service providers that they will be able to provide the services and functions meeting our specifications and requirements. If we fail to identify and engage all such service providers or personnel, or if the providers fail to satisfy our specifications and requirements, it could have a material adverse effect on our ability to develop and maintain the Tokens and related technology successfully.

There is currently no trading market for the Tokens, and a trading market may never develop.

There is currently no trading market available for the Tokens and no suitable platform pursuant to which Tokenholders may transfer or resell their Tokens (such a marketplace, a “Designated Marketplace”). Peer-to-peer trading will not be permitted unless and until Tokenholders are notified otherwise by us and informed of the requirements to do so. We are aware of certain Alternative Trading Systems (“ATSS”) that intend to facilitate secondary trading of security tokens, such as tZero and Templum, but we cannot provide any assurances as to whether any such ATS will become and remain operational and facilitate trading of the Tokens. Even if an ATS becomes and remains operational, there is no guarantee that there will be a sufficient number of Tokens outstanding to facilitate a liquid market. As a result, Tokenholders should be prepared to hold their Tokens indefinitely. In the event that the Tokens remain un-tradable indefinitely, the value of the Tokens could be materially adversely affected.

We do not expect there to be any market makers to develop a trading market in the Tokens in the near future.

Most securities that are publicly traded in the U.S. have one or more broker-dealers acting as “market makers” for the security. A market maker is a firm that stands ready to buy and sell the security on a regular and continuous basis at publicly quoted prices. In the event that a Designated Marketplace is created or developed, we do not believe that the Tokens will have any market makers at that time, which could contribute to a lack of liquidity in the Tokens, and could have a material adverse effect on holders’ ability to trade the Tokens. We cannot provide any assurances as to if or when we will be able to appoint any market makers for the Tokens that are satisfactory to us.

The prices of digital assets have been extremely volatile and the Tokens may be subject to significant price volatility.

The prices of digital assets have historically been subject to dramatic fluctuations and are highly volatile, and the market price of the Tokens may also be highly volatile. Several factors may influence the market price, if any, of the Tokens, including, but not limited to:

- the ability of the Tokens to trade in a secondary market, if at all;
- the availability of a Designated Marketplace or other trading platform for digital assets;
- global digital asset and security token supply;
- global digital asset demand, the security of online digital asset exchanges and digital wallets that hold digital assets, the perception that the use and holding of digital assets is safe and secure and the regulatory restrictions on their use;
- changes in the software, software requirements or hardware requirements underlying the Tokens;
- changes in the rights, obligations, incentives or rewards for the various Tokenholders;
- interruptions in service from or failures of major digital asset and security token exchanges on which digital assets and security tokens are traded;
- investment and trading activities of large purchasers, including private and registered funds, that may directly or indirectly invest in securities tokens or other digital assets;
- regulatory measures, if any, that affect the use of digital assets and security tokens such as the Tokens; and
- expectations among digital assets participants that the value of security tokens or other digital assets will soon change.

A decrease in the price of a single digital asset may cause volatility in the entire digital asset and security token industry and may affect other digital assets including the Tokens. Such volatility in the price of the Tokens may result in significant loss over a short period of time.

Tokenholders will generally not have voting rights and will generally have no ability to influence our decisions.

Tokenholders will have no voting rights except as required by Delaware law. As a result, except with respect to matters required to be submitted to Tokenholders under Delaware law, all matters submitted to stockholders will be decided by the vote of holders of our capital stock entitled to vote thereon, which shall not include the Tokens. As a result, Tokenholders will have no ability to elect directors or, except with respect to matters required to be submitted to Tokenholders under Delaware law, to determine the outcome of any other matters submitted to a vote of our stockholders.

We do not expect to pay any dividends on the Tokens.

Dividends will not be paid with respect to the Tokens.

Issuances by us of additional securities, whether in traditional or token format, could affect ownership and voting rights over us. In addition, the issuance of preferred shares, or options or warrants to purchase those preferred shares, could negatively impact the value of the Tokens as the result of preferential dividend rights, conversion rights, redemption rights and liquidation provisions granted to the stockholders of such preferred shares.

From time to time, we may issue in public or private sales additional securities to third party investors. Such securities may provide holders with ownership and voting rights that could provide the holders thereof with substantial influence over the Company and its operations. Any preferred shares that may be issued shall have such rights, preferences, privileges and restrictions as may be designated from time-to-time by our board, including preferential dividend rights, voting rights, conversion rights, redemption rights and liquidation provisions. There cannot be any assurance that we will not issue preferred securities with rights and preferences that are more beneficial than those provided to Tokenholders.

The Tokens will be subject to complex and evolving U.S. and foreign laws and regulations regarding privacy, technology, data protection and other matters. Many of these laws and regulations are subject to change and uncertain interpretation, and could result in claims, increased cost of operations or otherwise harm our business.

The Tokens will be subject to a variety of laws and regulations in the U.S. and abroad, including user privacy, blockchain technology, broker dealer, data protection and intellectual property, among others. Foreign data protection, privacy, broker dealer and other laws and regulations are often more restrictive than those in the U.S. These U.S. federal and state and foreign laws and regulations are constantly evolving and can be subject to significant change. In addition, the application and interpretation of these laws and regulations are often uncertain.

The risk of our being found in violation of these or other laws and regulations in connection with the Tokens is further increased by the fact that many of them have not been fully interpreted by the regulatory authorities or the courts and are open to a variety of interpretations. Any action brought against us for violation of these or other laws or regulations, even if we successfully defend against it, could cause us to incur significant legal expenses and divert our management's attention from the operation of our business. If our operations are found to be in violation of any of these laws and regulations, we may be subject to any applicable penalty associated with the violation, including civil and criminal penalties, damages and fines, we could be required to refund payments received by us, and we could be required to curtail or cease our operations. Any of the foregoing consequences could seriously harm our business and our financial results. These existing and proposed laws and regulations can be costly to comply with and can result in negative publicity, increase our operating costs, require significant management time and attention, and subject us to claims or other remedies, including fines or demands that we modify or ceases existing practices. In addition, due to the novelty of the Tokens and the uncertain and evolving laws and regulations that apply, insurance underwriters may be unwilling to provide coverage for claims relating to the Tokens on terms acceptable to us, if at all. Any claims related to the Tokens or the Offering could have a material adverse effect on our current and future business.

The Staff of the SEC's Division of Enforcement and other regulatory agencies are conducting investigations regarding offerings of securities similar to the Tokens.

Recently, the Division of Enforcement of the SEC and other regulatory agencies have undertaken investigations of offerings of securities similar to the Tokens. Should the SEC or other agency choose to investigate the Offering or Token trading more generally, such investigations could result in delay of the Offering, negative publicity for us, and may have a material adverse effect on our current and future business.

Item 1B. Unresolved Staff Comments

None.

Item 2. Properties

We lease our manufacturing, research and development, and corporate offices in Lexington, Massachusetts occupying approximately 82,000 square feet. This lease agreement terminates in August 2023 with an option to renew for one additional ten-year period.

During December 2012 we entered into a commercial lease for approximately 5,600 square feet of office space in New York, New York for use as corporate offices that terminates in May 2020.

We also lease research and office facilities in Cambridge, United Kingdom. This lease terminates in November 2025.

In December 2015, we acquired a manufacturing facility with approximately 24,000 square feet in Berkeley, California to be used in the production and manufacture of antibody product candidates. In December 2015, we also entered into a commercial lease in

Berkeley, California for approximately 10,900 square feet to be used for corporate offices which expires in December 2020. We also have a sublease in Berkeley, California for parking that expires in May 2020.

We believe substantially all of our property and equipment is in good condition and that we have sufficient capacity to meet our current operational needs. We do not anticipate experiencing significant difficulty in retaining occupancy of any of our manufacturing or office facilities and will do so through lease renewals prior to expiration or through replacing them with equivalent facilities.

Item 3. Legal Proceedings

We are not party to any material legal proceedings.

Item 4. Mine Safety Disclosures

Not applicable.

PART II

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

Our common stock is currently listed on The Nasdaq Capital Market under the symbol “AGEN.” As of March 4, 2019, there were 389 holders of record and 25,576 beneficial holders of our common stock.

We have never paid cash dividends on our common stock, and we do not anticipate paying any cash dividends in the foreseeable future. We currently intend to retain future earnings, if any, for the future operation and expansion of our business. Any future payment of dividends on our common stock will be at the discretion of our Board of Directors and will depend upon, among other things, our earnings, financial condition, capital requirements, level of indebtedness, and other factors that our Board of Directors deem relevant.

Stock Performance

The following graph shows the cumulative total stockholder return on our common stock over the period spanning December 31, 2013 to December 31, 2018, as compared with that of the Nasdaq Stock Market (U.S. Companies) Index and the Nasdaq Biotechnology Index, based on an initial investment of \$100 in each on December 31, 2013. Total stockholder return is measured by dividing share price change plus dividends, if any, for each period by the share price at the beginning of the respective period and assumes reinvestment of dividends.

This stock performance graph shall not be deemed “filed” with the SEC or subject to Section 18 of the Exchange Act, nor shall it be deemed incorporated by reference in any of our filings under the Securities Act of 1933, as amended (the “Securities Act”).

COMPARISON OF CUMULATIVE TOTAL RETURN OF AGENUS INC.,

NASDAQ STOCK MARKET (U.S. COMPANIES) INDEX

AND NASDAQ BIOTECHNOLOGY INDEX

	12/31/2013	12/31/2014	12/31/2015	12/31/2016	12/31/2017	12/31/2018
Agenus Inc.	100.00	150.38	171.97	156.06	123.48	90.15
NASDAQ Stock Market (U.S. Companies) Index	100.00	113.40	119.89	128.89	165.29	158.87
NASDAQ Biotechnology Index	100.00	131.57	149.42	117.02	141.66	128.45

Item 6. Selected Financial Data

We have derived the condensed consolidated balance sheet data set forth below as of December 31, 2018 and 2017, and the condensed consolidated statement of operations data for each of the years in the three-year period ended December 31, 2018, from our audited consolidated financial statements included elsewhere in this Annual Report on Form 10-K.

You should read the selected condensed consolidated financial data in conjunction with “Management’s Discussion and Analysis of Financial Condition and Results of Operations,” our consolidated financial statements, and the notes to our consolidated financial statements included elsewhere in this Annual Report on Form 10-K.

Changes in cash, cash equivalents, and short-term investments, total current assets, total assets, total current liabilities, long-term debt and stockholders’ (deficit) equity in the periods presented below include the effects of the receipt of net proceeds from our debt offerings, equity offerings, royalty monetization transactions, the exercise of stock options, and employee stock purchases that totaled approximately \$291.2 million, \$81.5 million, \$3.4 million, \$220.4 million, and \$57.0 million in the years ended December 31, 2018, 2017, 2016, 2015, and 2014, respectively.

	For the Year Ended December 31,				
	2018	2017	2016	2015	2014
	(in thousands except per share data)				
Condensed Consolidated Statement of Operations Data:					
Revenue	\$36,784	\$42,877	\$22,573	\$24,817	\$6,977
Operating expenses:					
Research and development	(124,600)	(116,125)	(94,971)	(70,444)	(22,349)
General and administrative	(37,340)	(33,741)	(33,126)	(28,370)	(21,250)
Contingent purchase price consideration fair value adjustment	1,335	3,188	(1,953)	(6,704)	(6,699)
Operating loss	(123,822)	(103,801)	(107,477)	(80,701)	(43,321)
Loss on early extinguishment of debt	(10,767)	—	—	—	—
Non-operating income (expense)	(2,183)	1,977	(2,202)	(5,968)	2,096
Interest expense, net	(25,273)	(18,868)	(17,316)	(6,599)	(1,261)
Loss before taxes	(162,044)	(120,692)	(126,995)	(93,268)	(42,486)
Income tax benefit (1)	—	—	—	5,387	—
Net loss	(162,044)	(120,692)	(126,995)	(87,881)	(42,486)
Dividends on Series A-1 convertible preferred stock	(207)	(206)	(204)	(203)	(204)
Less: net loss attributable to non-controlling interest	(2,352)	—	—	—	—
Net loss attributable to Agenus Inc. common stockholders	\$(159,899)	\$(120,898)	\$(127,199)	\$(88,084)	\$(42,690)
Net loss attributable to Agenus Inc. common stockholders per common share, basic and diluted	\$(1.44)	\$(1.23)	\$(1.46)	\$(1.13)	\$(0.71)
Weighted average number of Agenus Inc. common shares outstanding,					
basic and diluted	110,772	98,415	87,070	78,212	59,754

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	As of December 31,				
	2018	2017	2016	2015	2014
	(in thousands)				
Condensed Consolidated Balance Sheet Data:					
Cash, cash equivalents and short-term investments	\$53,054	\$60,187	\$76,437	\$171,668	\$40,224
Total current assets	74,808	73,554	91,312	184,095	42,670
Total assets	136,401	138,402	156,986	242,228	74,527
Total current liabilities	68,062	56,438	40,851	28,934	9,229
Long-term debt, less current portion	13,212	142,385	130,542	114,326	4,769
Series C-1 convertible preferred stock	39,879	—	—	—	—
Total stockholders' (deficit) equity	(174,546)	(75,816)	(39,126)	70,728	23,018

(1) Given our history of incurring operating losses, no income tax benefit has been recognized in our consolidated statements of operations for the years ended December 31, 2018, 2017, 2016, and 2014 because of the loss before income taxes, and the need to recognize a valuation allowance on the portion of our deferred tax assets which will not be offset by the reversal of deferred

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tax liabilities. For the year ended December 31, 2015, we recognized an income tax benefit as a result of the deferred tax liabilities recognized in connection with the PhosImmune and XOMA antibody manufacturing facility acquisitions.

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

Agenus Inc. (including its subsidiaries, collectively referred to as "Agenus," the "Company," "we," "us," and "our") is a clinical-stage immuno-oncology ("I-O") company with a pipeline of immune modulating antibodies, cancer vaccines, adjuvants and adoptive cell therapies dedicated to becoming a leader in the discovery and development of innovative combination therapies and committed to bringing effective medicines to patients with cancer. Our business is designed to drive success in I-O through speed, innovation, and effective combination therapies. In addition to a diverse pipeline we have assembled fully integrated capabilities including novel target discovery, antibody generation, cell line development, and good manufacturing practice ("GMP") manufacturing. We believe that these fully integrated capabilities enable us to produce novel candidates on timelines that are shorter than the industry standard. Leveraging from our science and capabilities we have forged important partnerships to advance our innovation.

We are developing a comprehensive I-O portfolio driven by the following platforms and programs, which we intend to utilize individually and in combination:

- our antibody discovery platforms, including our Retrocyte Display™, SECAN[®] yeast display, and phage display technologies designed to drive the discovery of future CPM antibody candidates;
- our antibody candidate programs, including our CPM programs;
- our vaccine programs, including Prophage™, AutoSynVax™ and PhosphoSynVax™;
- our saponin-based vaccine adjuvants, principally our QS-21 Stimulon[®] adjuvant, or QS-21 Stimulon; and
- our cell therapy subsidiary, AgenTus Therapeutics, which is designed to drive the discovery of future adoptive cell therapy, or "living drugs" (CAR-T and TCR) programs.

We assess development, commercialization and partnering strategies for each of our product candidates periodically based on several factors, including pre-clinical and clinical trial results, competitive positioning and funding requirements and resources. We are currently advancing our proprietary anti-CTLA-4 and anti-PD-1 antibodies in trials that are designed to be registrational and to support one or more BLA filings as soon as 2020.

We have formed collaborations with companies such as Incyte Corporation ("Incyte"), Merck Sharpe & Dohme ("Merck") and Recepta Biopharma SA ("Recepta"). Through these alliances, as well as our own internal programs, we currently have more than a dozen antibody programs in pre-clinical or clinical development, including our anti-CTLA-4 and anti-PD-1 antibody programs (both partnered with Recepta for certain South America territories) and anti-GITR and anti-OX40 antibody programs (both partnered with Incyte). In February 2017, we amended our collaboration agreement with Incyte to, among other things, convert the GITR and OX40 programs from profit-share to royalty-bearing programs, and there are no longer any profit-share programs remaining under the collaboration. Pursuant to the amended agreement, we received accelerated milestone payments of \$20.0 million from Incyte related to the clinical development of INCAGN1876 (anti-GITR agonist) and INCAGN1949 (anti-OX40 agonist). Concurrent with the execution of the amendment, we and Incyte also entered into the Stock Purchase Agreement whereby Incyte purchased an additional 10 million shares of our common stock at \$6.00 per share, resulting in additional proceeds of \$60.0 million to us. On September 20, 2018, we, through our wholly-owned subsidiary, Agenus Royalty Fund, LLC, entered into a Royalty Purchase Agreement (the "XOMA Royalty Purchase Agreement") with XOMA (US) LLC ("XOMA"). Pursuant to the terms of the XOMA Royalty Purchase Agreement, XOMA paid us \$15.0 million at closing in exchange for the right to receive 33% of the future royalties and 10% of the future milestones that we are entitled to receive from Incyte and Merck, net of certain of our obligations to a third party and excluding the next milestone that we expect to receive from Incyte. After taking into account our obligations under the XOMA Royalty Purchase Agreement, as of December 31, 2018, we remain eligible to receive up to \$450.0 million and \$85.5 million in potential development, regulatory and commercial milestones from Incyte and Merck, respectively.

In December 2018, we entered into a series of agreements with Gilead Sciences, Inc. ("Gilead") to collaborate on the development and commercialization of up to five novel I-O therapies. Pursuant to the collaboration agreements, we received an upfront cash payment from Gilead of \$120.0 million following the closing in January 2019 and are

eligible to receive up to an additional \$1.7 billion in aggregate potential fees and milestones. At closing, Gilead received worldwide exclusive rights to our bispecific antibody, AGEN1423. Gilead also received the exclusive option to license exclusively AGEN1223, a bispecific antibody, and AGEN2373, a monospecific antibody. We recently filed INDs for AGEN1423 and AGEN1223 and are planning to file an IND for AGEN2373 in the first half of 2019. We are responsible for developing the option programs up to the option decision points, at which time Gilead may acquire exclusive rights to the programs on option exercise. For either, but not both, of the option programs, we have the right to opt-in to share Gilead's development and commercialization costs in the United States in exchange for a profit (loss) share on a 50:50 basis and revised milestone payments. Gilead also received the right of first negotiation for two additional,

undisclosed preclinical programs. At the closing, Gilead also purchased 11,111,111 shares of Agenus common stock for \$30.0 million pursuant to a stock purchase agreement.

In addition to our antibody platforms and CPM programs, we are also advancing a series of vaccine programs to treat cancer. In January 2017, we announced a clinical trial collaboration with the National Cancer Institute (“NCI”), which is a double-blind, randomized controlled Phase 2 trial that is evaluating the effect of our autologous vaccine candidate, Prophage, in combination with pembrolizumab (Keytruda®, Merck & Co., Inc. (“Merck”)) in patients with newly diagnosed glioblastoma. Under this collaboration, we are supplying Prophage, Merck is supplying pembrolizumab and the NCI and Brain Tumor Trials Collaborative member sites are recruiting patients and conducting the trial.

Our QS-21 Stimulon adjuvant is partnered with GlaxoSmithKline (“GSK”) and is a key component in multiple GSK vaccine programs. These programs are in various stages, with the most advanced being GSK’s shingles vaccine, Shingrix. In 2015, we monetized a portion of the future royalties we were contractually entitled to receive from GSK from sales of its shingles and malaria vaccines through a Note Purchase Agreement (“NPA”) and received net proceeds of approximately \$78 million. In October 2017, GSK’s shingles vaccine was approved in the United States by the FDA and granted marketing authorization in Canada by Health Canada, and in November 2017, we exercised our option to issue the \$15.0 million in additional notes in accordance with the terms of the NPA. In January 2018, we entered into a Royalty Purchase Agreement with Healthcare Royalty Partners III, L.P. and certain of its affiliates (together, “HCR”), pursuant to which HCR purchased 100% of our worldwide rights to receive royalties from GSK on GSK’s sales of vaccines containing our QS-21 Stimulon adjuvant. We used the majority of the upfront proceeds from HCR to redeem all of the notes issued pursuant to the NPA, resulting in net proceeds to us of approximately \$28.0 million at closing. We do not incur clinical development costs for products partnered with GSK. Pursuant to our agreement with HCR, we are entitled to receive up to \$40.35 million in milestone payments based on GSK’s sales of Shingrix as follows: (i) \$15.1 million upon reaching \$2.0 billion last-twelve-months net sales any time prior to 2024 and (ii) \$25.25 million upon reaching \$2.75 billion last-twelve-months net sales any time prior to 2026. We are also obligated to pay HCR approximately \$25.9 million in 2021 if neither of the following Shingrix sales milestones are achieved: (i) 2019 sales exceed \$1.0 billion or (ii) 2020 sales exceed \$1.75 billion. GSK began selling Shingrix commercially in the fourth quarter of 2017. In February 2019, GSK reported that Shingrix sales for 2018, its first full year on the market, were over \$1.0 billion.

Our business activities include product research and development, intellectual property prosecution, manufacturing, regulatory and clinical affairs, corporate finance and development activities, and support of our collaborations. Our product candidates require clinical trials and approvals from regulatory agencies, as well as acceptance in the marketplace. Part of our strategy is to develop and commercialize some of our product candidates by continuing our existing arrangements with academic and corporate collaborators and licensees and by entering into new collaborations.

In October 2017, we announced the launch of a subsidiary that is advancing our cell therapy business, AgenTus Therapeutics. The subsidiary is focused on the discovery, development, and commercialization of breakthrough “living drugs” to advance cures for cancer patients. AgenTus Therapeutics licenses intellectual property assets from Agenus and has its own management and governance.

Our common stock is currently listed on The Nasdaq Capital Market under the symbol “AGEN.”

Our research and development expenses for the years ended December 31, 2018, 2017, and 2016, were \$124.6 million, \$116.1 million, and \$95.0 million, respectively. We have incurred significant losses since our inception. As of December 31, 2018, we had an accumulated deficit of \$1.18 billion.

To date, we have financed our operations primarily through the sale of equity and debt securities. We believe that, based on our current plans and activities, including additional funding we received in connection with our transactions with Gilead subsequent to December 31, 2018, our cash on-hand will be sufficient to satisfy our liquidity requirements

for more than one year from when these financial statements were issued. We may attempt to raise additional funds by: (1) pursuing collaboration, out-licensing and/or partnering opportunities for our portfolio programs and product candidates with one or more third parties, (2) renegotiating third party agreements, (3) selling assets, (4) securing additional debt financing and/or (5) selling equity securities. Satisfying long-term liquidity needs may require the successful commercialization and/or substantial out-licensing or partnering arrangements for our antibody discovery platforms, CPM antibody programs, and HSP-based vaccines. Our long-term success will also be dependent on the successful identification, development and commercialization of potential other product candidates, each of which will require additional capital with no certainty of timing or probability of success. If we incur operating losses for longer than we expect, and/or we are unable to raise additional capital, we may become insolvent and be unable to continue our operations.

Historical Results of Operations

Year Ended December 31, 2018 Compared to the Year Ended December 31, 2017

Research and development revenue

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We recognized research and development (“R&D”) revenue of approximately \$19.5 million and \$42.7 million during the years ended December 31, 2018 and 2017, respectively. R&D revenues for the year ended December 31, 2018, primarily consisted of fees earned under our Collaboration Agreement with Incyte, including \$10.0 million related to the recognition of milestones and \$4.1 million related to the reimbursement of development costs, which have decreased due to the stage of the programs under the collaboration, and \$4.0 million related to the recognition of a milestone under our license agreement with Merck. R&D revenues for the year ended December 31, 2017, also primarily consisted of fees earned under our Collaboration Agreement with Incyte including \$20.0 million related to the acceleration of milestone payments and \$14.6 million related to the reimbursement of development costs in addition to \$4.0 million related to the recognition of a milestone under our license agreement with Merck, \$1.0 million related to the recognition of a milestone under our license agreement with GSK. During the years ended December 31, 2018 and 2017, we recorded revenue of \$1.3 million and \$3.1 million, respectively, from the amortization of deferred revenue. See Notes 2 and 14 to our Consolidated Financial Statements for additional discussion of our revenues, including the adoption of ASC 606 during the first quarter of 2018.

Non-cash royalty revenue related to the sale of future royalties

In January 2018, we sold 100% of our worldwide rights to receive royalties from GSK on sales of GSK’s vaccines containing our QS-21 Stimulon adjuvant to HCR. As described in Note 18 to our Consolidated Financial Statements, this transaction has been recorded as a liability that amortizes over the estimated life of our Royalty Purchase Agreement with HCR. As a result of this liability accounting, even though the royalties are remitted directly to HCR, we record these royalties from GSK as revenue. During the year ended December 31, 2018, we recognized approximately \$17.3 million in non-cash royalty revenue related to our agreement with GSK.

Research and development expense

Research and development expense include the costs associated with our internal research and development activities, including compensation and benefits, occupancy costs, clinical manufacturing costs, contract research organization costs, costs of consultants, and related administrative costs. Research and development expense increased 7% to \$124.6 million for the year ended December 31, 2018 from \$116.1 million for the year ended December 31, 2017. Increased expenses in the year ended December 31, 2018 primarily relate to a \$7.3 million increase in third-party services and other related expenses largely relating to the advancement of our antibody programs and a \$3.0 million increase in expenses attributable to the activities of our subsidiaries, AgenTus Therapeutics and our wholly-owned subsidiary in the United Kingdom, Agenus UK Limited, which increase was partially offset by a decrease in expenses due to the closure of our facility in Basel, Switzerland in 2017. These increases were partially offset by a \$1.6 million decrease in personnel related expenses, which consists of a \$2.8 million decrease in share based compensation expense partially offset by a \$1.2 million increase in other personnel related expenses, and a \$0.3 million decrease in other R&D expenses.

General and administrative expense

General and administrative expense consists primarily of personnel costs, facility expenses, and professional fees. General and administrative expense increased 11% to \$37.3 million for the year ended December 31, 2018 from \$33.7 million for the year ended December 31, 2017. Increased general and administrative expense in 2018 primarily relates to a \$1.9 million increase in professional fees, a \$1.0 million increase in other G&A expenses, and a \$1.0 million increase in expenses attributable to the activities of our subsidiaries, AgenTus Therapeutics and our wholly-owned subsidiary in the United Kingdom, Agenus UK Limited, which increase was partially offset by a decrease in expenses due to the closure of our facility in Basel, Switzerland in 2017. These increases were partially offset by a \$0.3 million decrease in personnel related expenses, which consists of a \$1.9 million decrease in share based compensation expense partially offset by a \$1.7 million increase in other personnel related expenses.

Contingent purchase price consideration fair value adjustment

Contingent purchase price consideration fair value adjustment represents the change in the fair value of our contingent purchase price consideration during the year ended December 31, 2018, which resulted from changes in our market capitalization and share price and changes in the credit spread since the prior year end. The fair value of our contingent purchase price consideration is based on estimates from a Monte Carlo simulation of our market capitalization and share price.

Loss on early extinguishment of debt

Loss on early extinguishment of debt of \$10.8 million for the year ended December 31, 2018 represents the payment of premiums and the write-off of unamortized debt issuance costs and discounts incurred in connection with the full redemption and termination of Antigenics' \$115.0 million principal amount of notes issued pursuant to the Note Purchase Agreement dated September 4, 2015 with Oberland Capital SA Zermatt LLC and the purchasers named therein.

Non-operating income (expense)

Non-operating expense increased \$4.2 million for the year ended December 31, 2018, from income of \$2.0 million for the year ended December 31, 2017, to expense of \$2.2 million for the year ended December 31, 2018, primarily due to our increased foreign currency exchange losses in 2018 compared to gains in 2017.

Interest expense, net

Interest expense, net increased to \$25.3 million for the year ended December 31, 2018 from \$18.9 million for the year ended December 31, 2017 due to the January 2018 closing of the Royalty Purchase Agreement with HCR and the resulting increase in non-cash interest expense compared to the amount recorded for our Note Purchase Agreement, which was outstanding in the year ended December 31, 2017, and fully redeemed and terminated simultaneously with the closing of the Royalty Purchase Agreement.

Year Ended December 31, 2017 Compared to the Year Ended December 31, 2016

Research and development revenue

We recognized research and development revenue of approximately \$42.7 million and \$22.4 million during the years ended December 31, 2017 and 2016, respectively. R&D revenues primarily included fees earned under our license agreements, including approximately \$14.6 million and \$16.2 million for the years ended December 31, 2017, and 2016, respectively, related to reimbursement of development costs under our Collaboration Agreement with Incyte. The increase in total revenue for the year ended December 31, 2017 is primarily attributable to the \$20.0 million in accelerated milestones, recognized as revenue during the twelve months ended December 31, 2017, related to the antibody candidates targeting G1TR and OX40 received in connection with the February 14, 2017 amendment to our License, Development and Commercialization Agreement with Incyte. During the years ended December 31, 2017 and 2016, we recorded revenue of \$3.1 million and \$3.5 million, respectively, from the amortization of deferred revenue.

Research and development expense

Research and development expense increased 22% to \$116.1 million for the year ended December 31, 2017 from \$95.0 million for the year ended December 31, 2016. Increased expenses in 2017 primarily relate to a \$17.6 million increase in third-party services and other expenses relating largely to the advancement of our CPM antibody programs, a \$3.3 million increase in payroll related costs primarily due to increased headcount, and a \$0.6 million increase in depreciation expense, offset by a \$0.4 million decrease in expense for our foreign subsidiaries due to the closure of our facility in Basel, Switzerland, which decrease was partially offset by increased expenses attributable to Agenus UK.

General and administrative expense

General and administrative expenses increased 2% to \$33.7 million for the year ended December 31, 2017 from \$33.1 million for the year ended December 31, 2016. Increased general and administrative expenses in 2017 primarily relate to a \$1.8 million increase in payroll related costs primarily due to increased headcount offset by a \$0.6 million decrease in professional fees due to the reduced use of consultants and a \$0.6 million decrease in expense for our foreign subsidiaries due to the closure of our facility in Basel, Switzerland, which decrease was partially offset by increased expenses attributable to Agenus UK.

Contingent purchase price consideration fair value adjustment

Contingent purchase price consideration fair value adjustment represents the change in the fair value of our contingent purchase price consideration during the year ended December 31, 2017, which resulted from changes in our market capitalization and share price and changes in the credit spread since the prior year end. The fair value of our contingent purchase price consideration is based on estimates from a Monte Carlo simulation of our market capitalization and share price.

Non-operating income (expense)

Non-operating income increased by \$4.2 million for the year ended December 31, 2017, from an expense of \$2.2 million for the year ended December 31, 2016, to income of \$2.0 million for the year ended December 31, 2017, primarily due to our increased foreign currency exchange gains in 2017 compared to losses in 2016.

Interest expense, net

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Interest expense net increased to \$18.9 million for the year ended December 31, 2017 from \$17.3 million for the year ended December 31, 2016 due to the compounding of interest on our debt under our Note Purchase Agreement and the issuance of additional notes under our NPA in November 2017.

Inflation

We believe that inflation has not had a material adverse effect on our business, results of operations, or financial condition to date.

Research and Development Programs

For the year ended December 31, 2018, our research and development programs consisted largely of our CPM antibody programs as indicated in the following table (in thousands).

Research and Development Program	Product	For the Year Ended December 31,			Prior to 2016	Total
		2018	2017	2016		
Heat shock proteins for cancer	Prophage and ASV	\$13,235	\$12,499	\$8,202	\$315,189	\$349,125
Antibody programs*	Various	97,011	95,656	83,920	76,712	353,299
Vaccine adjuvant	QS-21					
	Stimulon	211	222	77	13,799	14,309
Other research and development programs		14,143	7,748	2,772	67,822	92,485
Total research and development expenses		\$124,600	\$116,125	\$94,971	\$473,522	809,218

*Prior to 2014, costs were incurred by 4-AB, which we acquired in February 2014.

Research and development program costs include compensation and other direct costs plus an allocation of indirect costs, based on certain assumptions and our review of the status of each program. Our product candidates are in various stages of development and significant additional expenditures will be required if we start new clinical trials, encounter delays in our programs, apply for regulatory approvals, continue development of our technologies, expand our operations, and/or bring our product candidates to market. The total cost of any particular clinical trial is dependent on a number of factors such as trial design, length of the trial, number of clinical sites, number of patients, and trial sponsorship. The process of obtaining and maintaining regulatory approvals for new therapeutic products is lengthy, expensive, and uncertain. Because our CPM antibody programs are early stage, and because further development of HSP-based vaccines is dependent on clinical trial results, among other factors, we are unable to reliably estimate the cost of completing our research and development programs or the timing for bringing such programs to various markets or substantial partnering or out-licensing arrangements, and, therefore, when, if ever, material cash inflows are likely to commence. Active programs involving QS-21 Stimulon depend on our licensee successfully completing clinical trials, successfully manufacturing QS-21 Stimulon to meet demand, obtaining regulatory approvals and successfully commercializing product candidates containing QS-21 Stimulon.

Product Development Portfolio

Antibody Discovery Platforms and CPM Programs

Checkpoint antibodies regulate immune response against pathogens that invade the body and are achieving positive outcomes in a number of cancers that were untreatable only a few years ago. Two classes of checkpoint targets include:

1. inhibitory checkpoints that help suppress an immune response in order to prevent excessive immune reaction resulting in undesired inflammation and/or auto-immunity, and
2. stimulatory checkpoints that can enhance or amplify an antigen-specific immune response.

We possess a suite of antibody discovery platforms that are designed to drive the discovery of future CPM antibody candidates. We are planning to employ a variety of techniques to identify and optimize mono-specific and multi-specific antibody candidates, internally.

We and our partners currently have more than a dozen antibody programs in pre-clinical or clinical development, including our anti-CTLA-4 and anti-PD-1 antibody programs (both partnered with Recepta for certain South America territories) and anti-GITR, anti-OX40, anti-LAG3 and anti-TIM3 antibody programs (all partnered with Incyte). For additional information regarding our

antibody discovery platforms and checkpoint antibody program, please read Part I-Item 1. “Business” of this Annual Report on Form 10-K.

Prophage Vaccine Candidates

Our early vaccine technology, Prophage (HSPPC-96), is an autologous cancer vaccine therapy derived from cancer tissues that are surgically removed from an individual patient designed to contain a broad sampling of potentially antigenic mutant proteins to educate the patient’s immune system to seek out and destroy cancer. To date, more than 1,000 patients have been treated with Prophage. Data reported at ASCO in 2015 demonstrated that patients with newly diagnosed GBM (ndGBM) with lower immune suppression (measured by peripheral PD-L1 expression) had an improved response to vaccine. To further explore these findings, we announced a Phase 2 clinical trial collaboration with the National Cancer Institute (“NCI”) to evaluate Prophage in combination with pembrolizumab (Keytruda®). The trial is being conducted by the Brain Tumor Trials Collaborative (“BTTC”), led by Dr. Mark Gilbert, Chief of the Neuro-Oncology Branch at the NCI Center for Cancer Research with product provided by Agenus and Merck. The trial is ongoing. For additional information regarding regulatory risks and uncertainties, please read the risks identified under Part I-Item 1A. “Risk Factors” of this Annual Report on Form 10-K.

Neoantigen Vaccine Platforms

Our neoantigen vaccine platforms include: (i) individualized AutoSynVax™ (ASV™), which targets the unique antigens expressed by a patient’s own tumor, and (ii) off-the-shelf (or pre-manufactured) PhosphoSynVax™ (PSV™), which targets antigens expressed across patients and tumors, potentially enabling us to treat broader categories of patients.

Mutation-based neo-epitopes, which will form the basis for the immunogens used in ASV, appear to be almost always particular to a given patient. Therefore, ASV is a largely individualized vaccine product candidate. With a small amount of a patient’s tumor as a sample, our ASV program is designed to utilize next generation sequencing technologies coupled with complex bioinformatics algorithms to identify mutations in a tumor’s DNA and RNA. Once these mutations have been identified, we plan to manufacture synthetic peptides encoding these neoepitopes, load these peptides on to our recombinant HSP70 and deliver a fully synthetic polyvalent vaccine to the patient. This program is based on the hypothesis that the HSP70 platform would shuttle the mutated peptides to sites where they could be recognized by the immune system and elicit a cytotoxic and helper T cell response in patients with cancer.

Biochemically based neoantigens, such as those arising from dysregulated phosphorylation of various proteins in malignant cells, can serve as a tumor fingerprint across a broad histology of tumors. Through our acquisition of PhosImmune, we have a portfolio of proprietary phosphorylated antigenic targets that can be used for therapeutic development. PSV is a vaccine candidate designed to induce immunity against this novel class of tumor specific neoepitopes known as Phosphopeptides or PTTs. PSV is intended to induce cellular immunity to abnormal Phosphopeptide neoepitopes that are characteristic of these various forms of cancer. We believe PTTs are among the most promising candidates for anti-cancer immunity, as patients with PTT immunity have been shown to have better outcomes than those without PTT immunity. We have amassed a proprietary library of more than 2,000 PTTs. Many of these PTTs are shared among many cancer patients and across multiple tumor types. We are using these PTTs for developing multiple off-the-shelf vaccines. PSV is based on Agenus’ vaccine platform and includes our proprietary QS-21 Stimulon adjuvant and heat-shock protein backbone. Agenus is developing multiple indication-specific PSV offerings, with lead programs in acute myeloid leukemia (AML) and colorectal cancer (CRC). By leveraging our proprietary vaccine platform which has already demonstrated clinical safety and immunogenicity, we intend to advance at least one PSV formulation into the clinic in 2019. For additional information regarding our Neoantigen Vaccine Platforms, please read Part I-Item 1. “Business” of this Annual Report on Form 10-K.

QS-21 Stimulon Adjuvant

QS-21 Stimulon is an adjuvant, which is a substance added to a vaccine or other immunotherapy that is intended to enhance an immune response to the target antigens. QS-21 Stimulon is a natural product, a triterpene glycoside, or saponin, purified from the bark of the Chilean soapbark tree, *Quillaja saponaria*. QS-21 Stimulon has the ability to stimulate an antibody-mediated immune response and has also been shown to activate cellular immunity. It has become a key component in the development of investigational preventive vaccine formulations across a wide variety of diseases. These studies have been carried out by academic institutions and pharmaceutical companies in the United States and internationally. A number of these studies have shown QS-21 Stimulon to be significantly more effective in stimulating immune responses than aluminum hydroxide or aluminum phosphate, the adjuvants most commonly used in approved vaccines in the United States today. In January 2019, we announced that the Bill & Melinda Gates Foundation awarded us a grant to develop an alternative, plant cell culture-based manufacturing process to ensure the continuous future supply of QS-21 Stimulon adjuvant, further validating its importance to the global vaccines market. For additional information regarding QS-21 Stimulon, please read Part I-Item 1. “Business” of this Annual Report on Form 10-K.

Liquidity and Capital Resources

We have incurred annual operating losses since inception, and we had an accumulated deficit of \$1.18 billion as of December 31, 2018. We expect to incur significant losses over the next several years as we continue development of our technologies and product candidates, manage our regulatory processes, initiate and continue clinical trials, and prepare for potential commercialization of products. To date, we have financed our operations primarily through the sale of equity and debt securities, and interest income earned on cash, cash equivalents, and short-term investment balances. From our inception through December 31, 2018, we have raised aggregate net proceeds of approximately \$1.22 billion through the sale of common and preferred stock, the exercise of stock options and warrants, proceeds from our Employee Stock Purchase Plan, royalty monetization transactions, and the issuance of convertible and other notes.

We maintain an effective registration statement (the “Registration Statement”), covering the offering of up to \$250 million of common stock, preferred stock, warrants, debt securities and units. The Registration Statement includes prospectuses covering the offer, issuance and sale of up to 50 million shares of our common stock from time to time in “at-the-market offerings” pursuant to an At Market Issuance Sales Agreement (the “Sales Agreement”) with B. Riley FBR, Inc. as our sales agent. We sold approximately 15.9 million shares of our common stock pursuant to the Sales Agreement during the year ended December 31, 2018 and received aggregate net proceeds totaling \$36.4 million. As of December 31, 2018, approximately 34.1 million shares remain available for sale under the Sales Agreement.

As of December 31, 2018, we had debt outstanding of \$14.1 million in principal. In February 2015, we issued subordinated notes in the aggregate principal amount of \$14.0 million with annual interest at 8% (the “2015 Subordinated Notes”). The 2015 Subordinated Notes are due in February 2020. We and Antigenics entered into the Note Purchase Agreement with certain purchasers pursuant to which Antigenics issued, and we guaranteed, limited recourse notes in the aggregate principal amount of \$100.0 million, with an option to issue an additional \$15.0 million principal amount of limited recourse notes, which we exercised in November 2017. In January 2018, we entered into a Royalty Purchase Agreement with HCR whereby we received proceeds of \$190.0 million. We used \$161.9 million of these proceeds to redeem all of the notes issued pursuant to the NPA. Pursuant to our agreement with HCR, we are entitled to receive up to \$40.35 million in milestone payments based on GSK’s sales of Shingrix as follows: (i) \$15.1 million upon reaching \$2.0 billion last-twelve-months net sales any time prior to 2024 and (ii) \$25.25 million upon reaching \$2.75 billion last-twelve-months net sales any time prior to 2026. We are also obligated to pay HCR approximately \$25.9 million in 2021 if neither of the following Shingrix sales milestones are achieved: (i) 2019 sales exceed \$1.0 billion or (ii) 2020 sales exceed \$1.75 billion. In February 2019, GSK reported that Shingrix sales for 2018, its first full year on the market, were over \$1.0 billion.

Our cash, cash equivalents, and short-term investments at December 31, 2018 were \$53.1 million, a decrease of \$7.1 million from December 31, 2017, principally as a result cash used in operations. We believe that, based on our current plans and activities, including additional funding we received in connection with our transactions with Gilead subsequent to December 31, 2018, our cash on-hand will be sufficient to satisfy our liquidity requirements for more than one year from when these financial statements were issued. We continue to monitor the likelihood of success of our key initiatives and are prepared to discontinue funding of such activities if they do not prove to be feasible, restrict capital expenditures and/or reduce the scale of our operations.

Our future liquidity needs will be determined primarily by the success of our operations with respect to the progression of our product candidates and key development and regulatory events in the future. Potential sources of additional funding include: (1) pursuing collaboration, out-licensing and/or partnering opportunities for our portfolio programs and product candidates with one or more third parties, (2) renegotiating third party agreements, (3) selling assets, (4) securing additional debt financing and/or (5) selling equity securities. Satisfying long-term liquidity needs may require the successful commercialization and/or substantial out-licensing or partnering arrangements for our antibody discovery platforms, CPM antibody programs, and HSP-based vaccines. Our long-term success will also be dependent on the successful identification, development and commercialization of potential other product candidates,

each of which will require additional capital with no certainty of timing or probability of success. If we incur operating losses for longer than we expect, and/or we are unable to raise additional capital, we may become insolvent and be unable to continue our operations.

Our future cash requirements include, but are not limited to, supporting clinical trial and regulatory efforts and continuing our other research and development programs. Since inception, we have entered into various agreements with contract manufacturers, institutions, and clinical research organizations (collectively "third party providers") to perform pre-clinical activities and to conduct and monitor our clinical studies. Under these agreements, subject to the enrollment of patients and performance by the applicable third-party provider, we have estimated our total payments to be \$232.1 million over the term of the related activities. Through December 31, 2018, we have expensed \$171.7 million as research and development expenses and \$173.8 million has been paid under these agreements. The timing of expense recognition and future payments related to these agreements is subject to the enrollment of patients and performance by the applicable third-party provider. We have also entered into sponsored research agreements related to our product candidates that required payments of \$9.6 million, \$8.6 million of which have been paid as of December 31, 2018. We

plan to enter into additional agreements with third party providers as well as sponsored research agreements, and we anticipate significant additional expenditures will be required to initiate and advance our various programs.

Part of our strategy is to develop and commercialize some of our product candidates by continuing our existing collaboration arrangements with academic and collaboration partners and licensees and by entering into new collaborations. As a result of our collaboration agreements, we will not completely control the efforts to attempt to bring those product candidates to market. For example, our collaboration with Incyte for the development, manufacture and commercialization of CPM antibodies against certain targets is managed by a joint steering committee, which is controlled by Incyte.

Net cash used in operating activities for the years ended December 31, 2018 and 2017 was \$131.1 million and \$94.2 million, respectively. Our future ability to generate cash from operations will depend on achieving regulatory approval and market acceptance of our product candidates, achieving benchmarks as defined in existing collaboration agreements, and our ability to enter into new collaborations. Please see the “Note Regarding Forward-Looking Statements” of this Annual Report on Form 10-K and the risks highlighted under Part I-Item 1A. “Risk Factors” of this Annual Report on Form 10-K.

The table below summarizes our contractual obligations as of December 31, 2018 (in thousands).

	Total	Payments by Period			
		Less than 1 Year	1-3 Years	3-5 Years	More than
					5 Years
Long-term debt (1)	\$15,475	\$1,322	\$14,153	\$—	\$—
Operating leases (2)	10,951	2,499	4,152	3,372	927
Capital lease	540	374	166	—	—
Total	\$26,966	\$4,195	\$18,471	\$3,372	\$927

(1)Includes fixed interest payments.

(2)The leases and subleases for our properties expire at various times between 2020 and 2025.
Off-Balance Sheet Arrangements

At December 31, 2018, we had no off-balance sheet arrangements.

Critical Accounting Policies and Estimates

The SEC defines “critical accounting policies” as those that require the application of management’s most difficult, subjective, or complex judgments, often as a result of the need to make estimates about the effect of matters that are inherently uncertain and may change in subsequent periods.

The preparation of consolidated financial statements in conformity with U.S. generally accepted accounting principles requires us to make estimates and assumptions that affect the reported amounts of assets and liabilities and disclosures of contingent assets and liabilities at the date of the financial statements and the reported amounts of revenues and expenses during the reporting period. We base those estimates on historical experience and on various assumptions that are believed to be reasonable under the circumstances. Actual results could differ from those estimates.

The following listing is not intended to be a comprehensive list of all of our accounting policies. Our significant accounting policies are described in Note 2 of the notes to our consolidated financial statements contained elsewhere in this Annual Report on Form 10-K. In many cases, the accounting treatment of a particular transaction is dictated by U.S. generally accepted accounting principles, with no need for our judgment in its application. There are also areas in which our judgment in selecting an available alternative would not produce a materially different result. We have identified the following as our critical accounting policies.

Share-Based Compensation

We recognize share-based compensation expense in accordance with the fair value recognition provisions of the Financial Accounting Standards Board (“FASB”) Accounting Standards Codification (“ASC”) 718, Compensation—Stock Compensation. Compensation expense is recognized on a straight-line basis over the requisite service period of the award. Forfeitures are recognized as they occur.

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Share-based awards granted to certain non-employees have been accounted for based on the fair value method of accounting in accordance with ASC 505-50, Equity- Equity-Based Payments to Non-Employees. As a result, the non-cash charge to operations for non-employee awards with vesting or other performance criteria is affected each reporting period by changes in the fair value of our common stock.

Determining the appropriate fair value model and calculating the fair value of share-based awards requires the use of highly subjective assumptions, including the expected life of the share-based awards and stock price volatility. The assumptions used in calculating the fair value of share-based awards represent management's best estimates, but these estimates involve inherent uncertainties and the application of management judgment. As a result, if factors change and we use different assumptions, our share-based compensation expense could be materially different in the future. For performance condition awards, we estimate the probability that the performance condition will be met. See Note 12 of the notes to our consolidated financial statements contained elsewhere in this Annual Report on Form 10-K for a further discussion on share-based compensation.

Revenue Recognition

In May 2014, the FASB issued Accounting Standards Update ("ASU") No. 2014-09, Revenue from Contracts with Customers (Topic 606), which supersedes existing revenue recognition guidance. We adopted ASU 2014-09 and its related amendments (collectively known as "ASC 606") on January 1, 2018 using the modified retrospective method—i.e., by recognizing the cumulative effect of initially applying ASC 606 as an adjustment to the opening balance of equity at January 1, 2018. The reported results for 2018 reflect the application of ASC 606 guidance while the reported results for 2017 were prepared under the guidance of ASC 605, Revenue Recognition. The adoption of ASC 606 represents a change in accounting principle that will more closely align revenue recognition with the delivery of our goods and services and will provide financial statement readers with enhanced disclosures.

In accordance with ASC 606, revenue is recognized when a customer obtains control of promised goods or services. The amount of revenue recognized reflects the consideration to which we expect to be entitled to receive in exchange for these goods and services. Refer to Note 2 to our consolidated financial statements included within Item 8 of this Annual Report on Form 10-K for a more detailed description of our application of ASC 606.

Non-cash Interest Expense on Liability Related to Sale of Future Royalties

In January 2018 we entered into the HCR Royalty Purchase Agreement with HCR. Pursuant to the terms of the HCR Royalty Purchase Agreement, we sold to HCR 100% of our worldwide rights to receive royalties from GSK on sales of GSK's vaccines containing our QS-21 Stimulon adjuvant. Although we sold all of our rights to receive royalties on sales of GSK's vaccines containing QS-21, as a result of our obligation to HCR, we recorded the proceeds from this transaction as a liability on our consolidated balance sheet that will be amortized using the interest method over the estimated life of the HCR Royalty Purchase Agreement. As a result, we impute interest on the transaction and record non-cash interest expense at the estimated interest rate. Our estimate of the interest rate under the agreement is based on the amount of royalty payments to be received by HCR over the life of the arrangement. We periodically assess the expected royalty payments to HCR from GSK using a combination of historical results and forecasts from market data sources. To the extent such payments are greater or less than our initial estimates or the timing of such payments is materially different than our original estimates, we will prospectively adjust the amortization of the liability. There are a number of factors that could materially affect the amount and timing of royalty payments from GSK, all of which are not within our control. Such factors include, but are not limited to, changing standards of care, the introduction of competing products, manufacturing or other delays, biosimilar competition, patent protection, adverse events that result in governmental health authority imposed restrictions on the use of the drug products, significant changes in foreign exchange rates, and other events or circumstances that could result in reduced royalty payments from GSK, all of which would result in a reduction of non-cash royalty revenues and the non-cash interest expense over the life of the HCR Royalty Purchase Agreement. Conversely, if sales of GSK's vaccines containing QS-21 are more than expected, the non-cash royalty revenues and the non-cash interest expense recorded by us would be greater over the

life of the HCR Royalty Purchase Agreement.

Fair Value Measurements

In accordance with ASC 820, Fair Value Measurements and Disclosures, we measure fair value based on a hierarchy for inputs used in measuring fair value that maximizes the use of observable inputs and minimizes the use of unobservable inputs by requiring that observable inputs be used when available. The fair value hierarchy is broken down into three levels based on the source of inputs.

We measure our contingent purchase price considerations at fair value in accordance with ASC 825, Financial Instruments. The fair value contingent purchase price considerations are based on significant inputs not observable in the market, which require them to be reported as a Level 3 liability within the fair value hierarchy. The fair values of our 4-AB and PhosImmune contingent purchase price considerations are based on estimates from a Monte Carlo simulation of our market capitalization and share price, respectively.

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Market capitalization and share price were evolved using a geometric brownian motion, calculated daily for the life of the contingent purchase price consideration.

Acquired Intangible Assets, including IPR&D

IPR&D acquired in a business combination represents the fair value assigned to research and development assets that have not reached technological feasibility. The value assigned to acquired IPR&D is determined by estimating the costs to develop the acquired technology into commercially viable products, estimating the resulting revenue from the projects, and discounting the net cash flows to present value. The revenue and costs projections used to value acquired IPR&D are, as applicable, reduced based on the probability of success of developing a new drug. 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 us and our competitors. The rates utilized to discount the net cash flows to their present value are commensurate with the stage of development of the projects and uncertainties in the economic estimates used in the projections. Upon the acquisition of IPR&D, we complete an assessment of whether our acquisition constitutes the purchase of a single asset or a group of assets. We consider multiple factors in this assessment, including the nature of the technology acquired, the presence or absence of separate cash flows, the development process and stage of completion, quantitative significance and our rationale for entering into the transaction.

We review amounts capitalized as acquired IPR&D for impairment at least annually, as of October 31, and whenever events or changes in circumstances indicate that the carrying value of the assets might not be recoverable. When performing our impairment assessment, we have the option to first assess qualitative factors to determine whether it is necessary to recalculate the fair value of our acquired IPR&D. If we elect this option and believe, as a result of the qualitative assessment, that it is more-likely-than-not that the fair value of our acquired IPR&D is less than its carrying amount, we calculate the fair value using the same methodology as described above. If the carrying value of our acquired IPR&D exceeds its fair value, then the intangible asset is written-down to its fair value. Alternatively, we may elect to bypass the qualitative assessment and immediately recalculate the fair value of our acquired IPR&D.

Finite-lived intangible assets are amortized over their useful life. We review finite-lived intangible assets for impairment whenever events or changes in circumstances indicate that the carrying value of the assets might not be recoverable.

Goodwill

Goodwill is tested at least annually for impairment on a reporting unit basis. We have concluded that we consist of a single reportable segment and two reporting units. We assess goodwill for impairment by performing a quantitative analysis to determine whether the fair value of our reporting units exceed their carrying value. We perform our annual impairment test as of October 31 of each year and the first step of our impairment analysis compares the fair value of each reporting unit to its net book value to determine if there is an indicator of impairment.

Recent Accounting Pronouncements

Refer to Note 2 to our consolidated financial statements included within Item 8 of this Annual Report on Form 10-K for a description of recent accounting pronouncements applicable to our business.

Item 7A. Quantitative and Qualitative Disclosures About Market Risk

Our primary market risk exposure is foreign currency exchange rate risk. International revenues and expenses are generally transacted by our foreign subsidiary and are denominated in local currency. Approximately 1% and 18% of our cash used in operations for the years ended December 31, 2018 and 2017, respectively, was from a foreign subsidiary. Additionally, in the normal course of business, we are exposed to fluctuations in interest rates as we seek debt financing and invest excess cash. We are also exposed to foreign currency exchange rate fluctuation risk related to our transactions denominated in foreign currencies. We do not currently employ specific strategies, such as the use of derivative instruments or hedging, to manage these exposures. Our currency exposures vary, but are primarily concentrated in the Euro, pound sterling, and Swiss Franc, in large part due to our wholly-owned subsidiaries, 4-AB, a company with operations in Switzerland, and Agenus UK Limited, a company with operations in the United Kingdom as well as our subsidiary AgenTus, a company with operations in the United Kingdom and Belgium. During the year ended December 31, 2018, there has been no material change with respect to our approach toward those exposures.

We had cash, cash equivalents and short-term investments at December 31, 2018 of \$53.1 million, which are exposed to the impact of interest and foreign currency exchange rate changes, and our interest income fluctuates as interest rates change. Due to the short-term nature of our investments in money market funds, our carrying value approximates the fair value of these investments at December 31, 2018, however, we are subject to investment risk.

We invest our cash and cash equivalents in accordance with our investment policy. The primary objectives of our investment policy are to preserve principal, maintain proper liquidity to meet operating needs, and maximize yields. We review our investment policy annually and amend it as deemed necessary. Currently, the investment policy prohibits investing in any structured investment vehicles and asset-backed commercial paper. Although our investments are subject to credit risk, our investment policy specifies credit quality standards for our investments and limits the amount of credit exposure from any single issue, issuer, or type of investment. We do not invest in derivative financial instruments. Accordingly, we do not believe that there is currently any material market risk exposure with respect to derivatives or other financial instruments that would require disclosure under this item.

Item 8. Financial Statements and Supplementary Data

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Report of Independent Registered Public Accounting Firm

To the Stockholders and Board of Directors
Agenus Inc.:

Opinion on the Consolidated Financial Statements

We have audited the accompanying consolidated balance sheets of Agenus Inc. and subsidiaries (the Company) as of December 31, 2018 and 2017, the related consolidated statements of operations and comprehensive loss, convertible preferred stock and stockholders' deficit, and cash flows for each of the years in the three-year period ended December 31, 2018, and the related notes (collectively, the consolidated financial statements). In our opinion, the consolidated financial statements present fairly, in all material respects, the financial position of the Company as of December 31, 2018 and 2017, and the results of its operations and its cash flows for each of the years in the three-year period ended December 31, 2018, in conformity with U.S. generally accepted accounting principles.

We also have audited, in accordance with the standards of the Public Company Accounting Oversight Board (United States) (PCAOB), the Company's internal control over financial reporting as of December 31, 2018, based on criteria established in Internal Control – Integrated Framework (2013) issued by the Committee of Sponsoring Organizations of the Treadway Commission, and our report dated March 18, 2019 expressed an unqualified opinion on the effectiveness of the Company's internal control over financial reporting.

Change in Accounting Principle

As discussed in Notes 2(k) and 14 to the consolidated financial statements, the Company changed its method of accounting for revenue as of January 1, 2018 due to the adoption of Accounting Standards Update No. 2014-09, Revenue from Contracts with Customers.

Basis for Opinion

These consolidated financial statements are the responsibility of the Company's management. Our responsibility is to express an opinion on these consolidated financial statements based on our audits. We are a public accounting firm registered with the 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. 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 that 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.

/s/ KPMG LLP

We have served as the Company's auditor since 1997.

Boston, Massachusetts

March 18, 2019

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AGENUS INC. AND SUBSIDIARIES

CONSOLIDATED BALANCE SHEETS

	December 31, 2018	December 31, 2017
ASSETS		
Cash and cash equivalents	\$53,053,531	\$60,186,617
Inventories	55,491	79,491
Accounts Receivable	938,141	1,134,493
Prepaid expenses	19,264,798	11,070,960
Other current assets	1,495,719	1,081,993
Total current assets	74,807,680	73,553,554
Property, plant and equipment, net of accumulated amortization and depreciation of		
\$38,068,114 and \$34,029,085 at December 31, 2018 and 2017, respectively	25,115,578	26,178,622
Goodwill	22,924,870	23,048,804
Acquired intangible assets, net of accumulated amortization of \$7,471,764 and		
\$5,461,834 at December 31, 2018 and 2017, respectively	12,338,186	14,406,650
Other long-term assets	1,214,394	1,214,394
Total assets	\$136,400,708	\$138,402,024
LIABILITIES, CONVERTIBLE PREFERRED STOCK AND STOCKHOLDERS' DEFICIT		
Current portion, long-term debt	\$146,061	\$20,639,735
Current portion, liability related to sale of future royalties and milestones	27,443,232	-
Current portion, deferred revenue	1,814,146	4,484,882
Accounts payable	13,623,934	8,086,992
Accrued liabilities	24,551,286	21,569,449
Other current liabilities	483,557	1,657,063
Total current liabilities	68,062,216	56,438,121
Long-term debt	13,211,547	142,385,024
Liability related to sale of future royalties and milestones, net of current portion	182,817,015	-
Deferred revenue, net of current portion	1,165,143	7,748,284
Contingent purchase price consideration	3,038,000	4,373,000
Other long-term liabilities	2,773,445	3,273,387
Commitments and contingencies (Notes 16 and 20)		
CONVERTIBLE PREFERRED STOCK		
Preferred stock, par value \$0.01 per share; 5,000,000 shares authorized:		
Series C-1 convertible preferred stock; 18,459 shares and zero shares		
designated, issued, and outstanding at December 31, 2018 and 2017, respectively	39,879,089	-
STOCKHOLDERS' DEFICIT		
Series A-1 convertible preferred stock; 31,620 shares designated, issued, and	316	316
outstanding at December 31, 2018 and 2017; liquidation value		

of \$32,832,064, and \$32,625,220 at December 31, 2018, and 2017, respectively

Common stock, par value \$0.01 per share; 240,000,000 shares authorized;

119,996,331 shares and 101,706,117 shares issued at December 31, 2018 and 2017, respectively

Additional paid-in capital	1,199,964	1,017,061
Accumulated other comprehensive loss	1,005,183,033	951,811,958
Accumulated deficit	(1,539,367)	(2,169,354)
Total stockholders' deficit attributable to Agenus Inc.	(1,177,311,393)	(1,026,475,773)
Non-controlling interest	(172,467,447)	(75,815,792)
Total stockholders' deficit	(2,078,300)	-
Total liabilities, convertible preferred stock and stockholders' deficit	(174,545,747)	(75,815,792)
	\$ 136,400,708	\$ 138,402,024

See accompanying notes to consolidated financial statements.

AGENUS INC. AND SUBSIDIARIES

CONSOLIDATED STATEMENTS OF OPERATIONS AND COMPREHENSIVE LOSS

For the Years Ended December 31, 2018, 2017, and 2016

	2018	2017	2016
Revenue:			
Research and development	\$ 19,474,672	\$ 42,709,035	\$ 22,393,443
Other revenues	—	168,051	179,860
Non-cash royalty revenue related to the sale of future royalties	17,308,879	—	—
Total revenues	36,783,551	42,877,086	22,573,303
Operating expenses:			
Research and development	(124,600,359)	(116,125,299)	(94,971,379)
General and administrative	(37,339,748)	(33,741,183)	(33,125,690)
Contingent purchase price consideration fair value adjustment	1,335,000	3,188,000	(1,953,000)
Operating loss	(123,821,556)	(103,801,396)	(107,476,766)
Other income (expense):			
Loss on early extinguishment of debt	(10,766,625)	—	—
Non-operating (expense) income	(2,183,278)	1,977,398	(2,202,336)
Interest expense, net	(25,272,557)	(18,868,494)	(17,316,073)
Net loss	(162,044,016)	(120,692,492)	(126,995,175)
Dividends on Series A-1 convertible preferred stock	(206,844)	(205,541)	(204,246)
Less: net loss attributable to non-controlling interest	(2,351,900)	—	—
Net loss attributable to Agenus Inc. common stockholders	\$(159,898,960)	\$(120,898,033)	\$(127,199,421)
Per common share data:			
Basic and diluted net loss attributable to Agenus Inc. common stockholders	\$(1.44)	\$(1.23)	\$(1.46)
Weighted average number of Agenus Inc. common shares outstanding:			
Basic and diluted	110,772,328	98,415,414	87,070,189
Other comprehensive income (loss):			
Foreign currency translation gain (loss)	\$ 629,987	\$(615,213)	\$ 677,536
Pension liability	—	(24,582)	(153,952)
Other comprehensive income (loss)	629,987	(639,795)	523,584
Comprehensive loss	\$(159,268,973)	\$(121,537,828)	\$(126,675,837)

See accompanying notes to consolidated financial statements.

AGENUS INC. AND SUBSIDIARIES

CONSOLIDATED STATEMENTS OF CONVERTIBLE PREFERRED STOCK AND STOCKHOLDERS' DEFICIT

For the Years Ended December 31, 2018, 2017, and 2016

Series	C-1	Series A-1	Convertible Preferred Stock	Convertible Preferred Stock	Common Stock	Additional Paid-In Capital	Treasury Stock	Accumulated Other Comprehensive Income (Loss)	Noncontrolling Interests	Controlled Deficit	Total		
Number of Shares	Number of Shares	Par Value	Number of Shares	Par Value	Paid-In Capital	Number of Shares	Amount	(Loss)	Interests	Deficit	Total		
1,	-	\$—	31,620	\$316	86,390,697	\$863,907	\$851,103,934	-	\$—	\$(2,053,143)	\$—	\$(779,187,464)	\$70
										(126,995,175)	(1		
ve	—	—	—	—	—	—	—	—	523,584	—	—	—	52
n ion	—	—	—	—	—	13,323,616	—	—	—	—	—	—	13
s	—	—	—	—	—	(318,677)	—	—	—	—	—	—	(3
	—	—	—	—	570,037	5,701	(5,701)	(185,117)	(768,236)	—	—	—	(7
at	—	—	—	—	496,520	4,965	2,162,105	—	—	—	—	—	2,
es	—	—	—	—	23,110	231	161,332	—	—	—	—	—	16
n of res	—	—	—	—	(188,184)	(1,882)	(1,632,554)	188,184	781,117	—	—	853,319	-
	—	—	—	—	157,513	1,575	885,223	—	—	—	—	—	88
s e	—	—	—	—	345,240	3,452	1,175,070	(3,067)	(12,881)	—	—	—	1,

ses

1,
—\$— 31,620 \$316 87,794,933 \$877,949 \$866,854,348 — \$— \$(1,529,559) \$—\$(905,329,320) \$(3

See accompanying notes to consolidated financial statements.

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AGENUS INC. AND SUBSIDIARIES

CONSOLIDATED STATEMENTS OF CONVERTIBLE PREFERRED STOCK AND STOCKHOLDERS' DEFICIT

(Continued)

For the Years Ended December 31, 2018, 2017, and 2016

Series	Number of Shares	Par Value	Number of Shares	Par Value	Additional Paid-In Capital	Treasury Stock	Accumulated Other Comprehensive Income (Loss)	Noncontrolling Interests	Controlled Deficit	Total
C-1 Convertible Preferred Stock	Series A-1 Convertible Preferred Stock		Common Stock			Number of Shares	Amount			
—	—	—	—	—	—	—	—	(639,795)	—	—
—	—	—	—	—	1,210,916	—	—	—	—	(1,292,230)
—	—	—	10,000,000	100,000	59,900,000	—	—	—	—	—
—	—	—	—	—	10,924,122	—	—	—	—	—
—	—	—	—	—	2,015,974	—	—	—	—	—
—	—	—	1,097,243	10,972	(10,972)	(155,523)	(527,223)	—	—	—
—	—	—	1,315,288	13,153	5,546,553	—	—	—	—	—
—	—	—	-	-	731,498	—	—	—	—	—
—	—	—	(155,523)	(1,555)	(1,363,937)	155,523	527,223	—	—	838,269

—	—	—	—	373,351	3,734	1,482,203	—	—	—	—	—
t	—	—	—	999,317	9,993	3,537,582	—	—	—	—	—
s	—	—	—	281,508	2,815	983,671	—	—	—	—	—
	—	\$—	31,620	\$316	101,706,117	\$1,017,061	\$951,811,958	—	\$—	\$(2,169,354)	\$—\$(1,026,475,773)

See accompanying notes to consolidated financial statements.

AGENUS INC. AND SUBSIDIARIES

CONSOLIDATED STATEMENTS OF CONVERTIBLE PREFERRED STOCK AND STOCKHOLDERS' DEFICIT

(Continued)

For the Years Ended December 31, 2018, 2017, and 2016

Series C-1 Convertible Preferred Stock		Series A-1 Convertible Preferred Stock		Common Stock		Treasury Stock		Accumulated Other Comprehensive Income (Loss)		Non-controlling Interest		Accumulated Deficit	
Number of Shares	Par Value	Number of Shares	Par Value	Number of Shares	Par Value	Number of Shares	Par Value	Number of Shares	Par Value	Number of Shares	Par Value	Number of Shares	Par Value
—	—	—	—	—	—	—	—	—	629,987	—	—	—	—
—	—	—	—	—	—	—	—	—	—	—	—	—	8,856,496
—	—	—	—	—	—	—	—	—	—	273,600	—	—	—
—	—	—	—	—	—	7,351,528	—	—	—	—	—	—	—
—	—	—	53,050	531	(531)	—	—	—	—	—	—	—
—	—	—	17,798,688	177,987	44,740,563	—	—	—	—	—	—	—	—
459	39,879,089	—	—	—	—	—	—	—	—	—	—	—	—
—	—	—	25,670	257	49,743	—	—	—	—	—	—	—	—
—	—	—	412,806	4,128	1,229,772	—	—	—	—	—	—	—	—

459 \$39,879,089 31,620 \$316 119,996,331 \$1,199,964 \$1,005,183,033 —\$—\$(1,539,367) \$(2,078,300) \$(1,177,311,3

See accompanying notes to consolidated financial statements.

AGENUS INC. AND SUBSIDIARIES

CONSOLIDATED STATEMENTS OF CASH FLOWS

For the Years Ended December 31, 2018, 2017, and 2016

	2018	2017	2016
Cash flows from operating activities:			
Net loss	\$(162,044,016)	\$(120,692,492)	\$(126,995,175)
Adjustments to reconcile net loss to net cash used in operating activities:			
Depreciation and amortization	6,288,001	6,006,299	4,947,787
Share-based compensation	7,625,128	12,428,655	13,188,364
Non-cash royalty revenue	(17,308,879)	—	—
Non-cash interest expense	24,598,564	18,242,299	16,530,437
Loss on disposal of assets	145,009	23,558	14,733
Change in fair value of contingent obligations	(1,335,000)	(3,188,000)	1,953,000
Gain on issuance of stock for settlement of milestone obligation	—	(566,488)	—
Loss on extinguishment of debt	10,766,625	—	—
Changes in operating assets and liabilities:			
Accounts receivable	196,352	10,217,529	(1,549,798)
Inventories	24,000	8,709	-
Prepaid expenses	(8,209,703)	(8,453,082)	(650,824)
Accounts payable	5,366,711	1,647,430	419,708
Deferred revenue	(397,382)	(2,722,020)	(3,939,619)
Accrued liabilities and other current liabilities	3,303,559	(4,848,372)	18,275,940
Other operating assets and liabilities	(113,486)	(2,329,168)	(2,155,364)
Net cash used in operating activities	(131,094,517)	(94,225,143)	(79,960,811)
Cash flows from investing activities:			
Proceeds from sale of plant and equipment	6,187	120,000	—
Purchases of plant and equipment	(3,597,107)	(3,120,357)	(12,519,738)
Purchases of available-for-sale securities	—	(14,936,047)	(54,884,101)
Proceeds from sale of available-for-sale securities	—	20,000,000	85,000,000
Net cash provided by (used in) investing activities	(3,590,920)	2,063,596	17,596,161
Cash flows from financing activities:			
Net proceeds from sale of equity	44,918,550	65,559,706	2,167,070
Net proceeds from sale of C-1 Preferred Stock	39,879,089	—	—
Proceeds from employee stock purchases and option exercises	1,233,900	986,486	1,183,598
Purchase of treasury shares to satisfy tax withholdings	—	(527,223)	(667,050)
Proceeds from issuance of long-term debt	—	15,000,000	—
Debt issuance costs	—	(150,000)	—
Proceeds from sale of future royalties	204,878,400	—	—
Transaction costs from sale of future royalties and milestones	(494,394)	—	—
Repayments of debt	(161,847,220)	—	—
Payment under a purchase agreement for in-process research and development	—	—	(5,000,000)
Payment of capital lease obligation	(283,408)	(330,744)	(144,658)
Net cash provided by (used in) financing activities	128,284,917	80,538,225	(2,461,040)
Effect of exchange rate changes on cash	(732,566)	361,923	(429,167)

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Net decrease in cash and cash equivalents	(7,133,086)	(11,261,399)	(65,254,857)
Cash and cash equivalents, beginning of period	60,186,617	71,448,016	136,702,873
Cash and cash equivalents, end of period	\$53,053,531	\$60,186,617	\$71,448,016
Supplemental cash flow information:			
Cash paid for interest	\$1,171,085	\$1,120,000	\$1,120,000
Supplemental disclosures - non-cash activities:			
Purchases of plant and equipment in accounts payable and			
accrued liabilities	\$299,637	\$968,400	\$695,466
Issuance of common stock, \$0.01 par value, issued in connection with the settlement of milestone obligation	—	1,485,937	886,798

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Issuance of common stock, \$0.01 par value, issued to directors as compensation	—	—	161,332
Issuance of common stock, \$0.01 par value, in connection with the acquisition of the SECANT yeast display technology	—	3,547,575	—
Issuance of common stock, \$0.01 par value, in connection with payment to consultant	50,000	—	—

See accompanying notes to consolidated financial statements.

AGENUS INC. AND SUBSIDIARIES

NOTES TO CONSOLIDATED FINANCIAL STATEMENTS

(1) Description of Business

Agenus Inc. (including its subsidiaries, collectively referred to as “Agenus,” the “Company,” “we,” “us,” and “our”) is a clinical-stage immuno-oncology (“I-O”) company with a pipeline of immune modulating antibodies, cancer vaccines, adjuvants and adoptive cell therapies dedicated to becoming a leader in the discovery and development of innovative combination therapies and committed to bringing effective medicines to patients with cancer. Our business is designed to drive success in I-O through speed, innovation, and effective combination therapies. In addition to a diverse pipeline we have assembled fully integrated capabilities including novel target discovery, antibody generation, cell line development, and good manufacturing practice (“GMP”) manufacturing. We believe that these fully integrated capabilities enable us to produce novel candidates on timelines that are shorter than the industry standard. Leveraging from our science and capabilities we have forged important partnerships to advance our innovation.

We are developing a comprehensive I-O portfolio driven by the following platforms and programs, which we intend to utilize individually and in combination:

- our antibody discovery platforms, including our Retrocyte Display™, SECANT[®] yeast display, and phage display technologies designed to drive the discovery of future CPM antibody candidates;
- our antibody candidate programs, including our CPM programs;
- our vaccine programs, including Prophage™, AutoSynVax™ and PhosphoSynVax™;
- our saponin-based vaccine adjuvants, principally our QS-21 Stimulon[®] adjuvant, or QS-21 Stimulon; and
- our cell therapy subsidiary, AgenTus Therapeutics, which is designed to drive the discovery of future adoptive cell therapy, or “living drugs” (CAR-T and TCR) programs.

Our business activities include product research and development, intellectual property prosecution, manufacturing, regulatory and clinical affairs, corporate finance and development activities, and support of our collaborations. Our product candidates require clinical trials and approvals from regulatory agencies, as well as acceptance in the marketplace. Part of our strategy is to develop and commercialize some of our product candidates by continuing our existing arrangements with academic and corporate collaborators and licensees and by entering into new collaborations.

Our cash, cash equivalents, and short-term investments at December 31, 2018 were \$53.1 million, a decrease of \$7.1 million from December 31, 2017.

	(Unaudited)			
	Quarter Ended			
	March 31,	June 30,	September 30,	December 31,
	2018	2018	2018	2018
Cash and cash equivalents	\$52.3	\$43.2	\$ 46.2	\$ 53.1
Increase (decrease) in cash and cash equivalents	\$(7.8)	\$(9.2)	\$ 3.0	\$ 6.9
Cash used in operating activities	\$(40.2)	\$(30.5)	\$ (24.6)	\$ (35.8)
Reported net loss	\$(54.3)	\$(25.2)	\$ (33.7)	\$ (48.8)

We have incurred significant losses since our inception. As of December 31, 2018, we had an accumulated deficit of \$1.18 billion. Since our inception, we have successfully financed our operations through the sale of equity, notes, corporate partnerships, and interest income. We believe that, based on our current plans and activities, including additional funding we received in connection with our transactions with Gilead subsequent to December 31, 2018, our cash on-hand will be sufficient to satisfy our liquidity requirements for more than one year from when these financial statements were issued. We continue to monitor the likelihood of success of our key initiatives and are prepared to discontinue funding of such activities if they do not prove to be feasible, restrict capital expenditures and/or reduce the scale of our operations.

Our future liquidity needs will be determined primarily by the success of our operations with respect to the progression of our product candidates and key development and regulatory events in the future. Potential sources of additional funding include: (1) pursuing collaboration, out-licensing and/or partnering opportunities for our portfolio programs and product candidates with one or more third parties, (2) renegotiating third party agreements, (3) selling assets, (4) securing additional debt financing and/or (5) selling equity securities. Our ability to address our future liquidity needs will largely be determined by the success of our product candidates and key development and regulatory events and our decisions in the future.

Research and development program costs include compensation and other direct costs plus an allocation of indirect costs, based on certain assumptions, and our review of the status of each program. Our product candidates are in various stages of development and significant additional expenditures will be required if we start new trials, encounter delays in our programs, apply for regulatory approvals, continue development of our technologies, expand our operations, and/or bring our product candidates to market. The eventual total cost of each clinical trial is dependent on a number of factors such as trial design, length of the trial, number of clinical sites, and number of patients. The process of obtaining and maintaining regulatory approvals for new therapeutic products is lengthy, expensive, and uncertain. Because our antibody and neoantigen vaccine programs are early stage, and because any further development of HSP-based vaccines is dependent on clinical trial results, among other factors, we are unable to reliably estimate the cost of completing our research and development programs or the timing for bringing such programs to various markets or substantial partnering or out-licensing arrangements, and, therefore, when, if ever, material cash inflows are likely to commence. We will continue to adjust our spending as needed in order to preserve liquidity.

(2) Summary of Significant Accounting Policies

(a) Basis of Presentation and Principles of Consolidation

The consolidated financial statements have been prepared in accordance with U.S. generally accepted accounting principles and include the accounts of Agenus and our subsidiaries. All significant intercompany transactions and accounts have been eliminated in consolidation. Non-controlling interest in the consolidated financial statements represents the portion of AgenTus Therapeutics not owned by Agenus.

(b) Segment Information

We are managed and currently operate as two segments. However, we have concluded that our two operating segments meet all three criteria required by Financial Accounting Standards Board (“FASB”) Accounting Standards Codification (“ASC”) 280, Segment Reporting to be aggregated into one reportable segment. The aggregation of our two operating segments into one reportable segment is consistent with the objectives and basic principles of ASC 280. Our two operating segments have similar economic characteristics and are both similar with respect to the five qualitative characteristics specified in ASC 280. Accordingly, we do not have separately reportable segments as defined by ASC 280.

(c) Use of Estimates

The preparation of consolidated financial statements in conformity with U.S. generally accepted accounting principles requires us to make estimates and assumptions that affect the reported amounts of assets and liabilities and disclosures of contingent assets and liabilities at the date of the consolidated financial statements and the reported amounts of revenues and expenses during the reporting period. We base those estimates on historical experience and on various assumptions that are believed to be reasonable under the circumstances. Actual results could differ from those estimates.

(d) Cash and Cash Equivalents

We consider all highly liquid investments purchased with maturities at acquisition of three months or less to be cash equivalents. Cash equivalents consist primarily of money market funds.

(e) Investments

We classify investments in marketable securities at the time of purchase. Gains and losses on the sale of marketable securities are recognized in operations based on the specific identification method. At both December 31, 2018 and 2017 we had no holdings classified as investments.

(f) Concentrations of Credit Risk

Financial instruments that potentially subject us to concentrations of credit risk are primarily cash equivalents, investments, and accounts receivable. We invest our cash, cash equivalents and short-term investments in accordance with our investment policy, which specifies high credit quality standards and limits the amount of credit exposure from any single issue, issuer, or type of investment. We carry balances in excess of federally insured levels, however, we have not experienced any losses to date from this practice.

(g) Inventories

Inventories are stated at the lower of cost or net realizable value. Cost has been determined using standard costs that approximate the first-in, first-out method. Inventory as of December 31, 2018 and 2017 consisted solely of finished goods.

(h) Accounts Receivable

Accounts receivable are amounts due from our collaboration partner as a result of research and development services provided and reimbursements under co-funded research and development programs. We considered the need for an allowance for doubtful accounts and have concluded that no allowance was needed as of December 31, 2018 and 2017, as the estimated risk of loss on our accounts receivable was determined to be minimal.

(i) Property, Plant and Equipment

Property, plant and equipment, including software developed for internal use, are carried at cost. Depreciation is computed using the straight-line method over the estimated useful lives of the assets. Amortization of leasehold improvements is computed over the shorter of the lease term or estimated useful life of the asset. Additions and improvements are capitalized, while repairs and maintenance are charged to expense as incurred. Amortization and depreciation of plant and equipment was \$4.3 million, \$3.8 million, and \$2.7 million, for the years ended December 31, 2018, 2017, and 2016, respectively.

(j) Fair Value of Financial Instruments

The estimated fair values of all our financial instruments, excluding our outstanding debt as of December 31, 2017, approximate their carrying amounts in the consolidated balance sheets. The fair value of our outstanding debt is based on a present value methodology. The outstanding principal amount of our debt, including the current portion, was \$14.1 million and \$129.1 million at December 31, 2018 and 2017, respectively.

(k) Revenue Recognition

In May 2014, the Financial Accounting Standards Board (“FASB”) issued Accounting Standards Update (“ASU”) No. 2014-09, Revenue from Contracts with Customers (Topic 606), which supersedes existing revenue recognition guidance. We adopted ASU 2014-09 and its related amendments (collectively known as “ASC 606”) on January 1, 2018 using the modified retrospective method- i.e., by recognizing the cumulative effect of initially applying ASC 606 as an adjustment to the opening balance of equity at January 1, 2018. The reported results for 2018 reflect the application of ASC 606 guidance while the reported results for 2017 were prepared under the guidance of ASC 605, Revenue Recognition (“ASC 605”). The adoption of ASC 606 represents a change in accounting principle that will more closely align revenue recognition with the delivery of our goods and services and will provide financial statement readers with enhanced disclosures. The details of the significant changes and quantitative impact of the changes are disclosed in Note 14.

For the years ended December 31, 2018, 2017 and 2016, 43%, 87% and 87%, respectively, of our revenue was earned from one collaboration partner.

In accordance with ASC 606, revenue is recognized when a customer obtains control of promised goods or services. The amount of revenue recognized reflects the consideration to which we expect to be entitled to receive in exchange for these goods and services. To achieve this core principle, we apply the following five steps:

1) Identify the contract with the customer

A contract with a customer exists when (i) the Company enters into an enforceable contract with a customer that defines each party’s rights regarding the goods or services to be transferred and identifies the related payment terms, (ii) the contract has commercial substance, and (iii) the Company determines that collection of substantially all consideration for goods and services that are transferred is probable based on the customer’s intent and ability to pay the promised consideration. The Company applies judgment in determining the customer’s intent and ability to pay, which is based on a variety of factors including the customer’s historical payment experience, or in the case of a new

customer, published credit and financial information pertaining to the customer.

2) Identify the performance obligations in the contract

Performance obligations promised in a contract are identified based on the goods and services that will be transferred to the customer that are both capable of being distinct, whereby the customer can benefit from the good or service either on its own or together with other available resources, and are distinct in the context of the contract, whereby the transfer of the good or service is separately identifiable from other promises in the contract. To the extent a contract includes multiple promised goods and services, the Company must apply judgment to determine whether promised goods and services are capable of being distinct and are distinct in the context of the contract. If these criteria are not met, the promised goods and services are accounted for as a combined performance obligation.

3) Determine the transaction price

The transaction price is determined based on the consideration to which the Company will be entitled in exchange for transferring goods and services to the customer. To the extent the transaction price includes variable consideration, the Company estimates the amount of variable consideration that should be included in the transaction price utilizing either the expected value method or the most likely amount method depending on the nature of the variable consideration. Variable consideration is included in the transaction price if, in the Company's judgment, it is probable that a significant future reversal of cumulative revenue under the contract will not occur. Any estimates, including the effect of the constraint on variable consideration, are evaluated at each reporting period for any changes. Determining the transaction price requires significant judgment, which is discussed in further detail for each of the Company's contracts with customers in Note 14.

4) Allocate the transaction price to performance obligations in the contract

If the contract contains a single performance obligation, the entire transaction price is allocated to the single performance obligation. Contracts that contain multiple performance obligations require an allocation of the transaction price to each performance obligation on a relative stand-alone selling price basis unless the transaction price is variable and meets the criteria to be allocated entirely to a performance obligation or to a distinct service that forms part of a single performance obligation. The consideration to be received is allocated among the separate performance obligations based on relative stand-alone selling prices. Determining the amount of the transaction price to allocate to each separate performance obligation requires significant judgement, which is discussed in further detail for each of the Company's contracts with customers in Note 14.

5) Recognize revenue when or as the Company satisfies a performance obligation

The Company satisfies performance obligations either over time or at a point in time. Revenue is recognized over time if either 1) the customer simultaneously receives and consumes the benefits provided by the entity's performance, 2) the entity's performance creates or enhances an asset that the customer controls as the asset is created or enhanced, or 3) the entity's performance does not create an asset with an alternative use to the entity and the entity has an enforceable right to payment for performance completed to date. If the entity does not satisfy a performance obligation over time, the related performance obligation is satisfied at a point in time by transferring the control of a promised good or service to a customer. Examples of control are using the asset to produce goods or services, enhance the value of other assets, settle liabilities, and holding or selling the asset. ASC 606 requires the Company to select a single revenue recognition method for the performance obligation that faithfully depicts the Company's performance in transferring control of the goods and services. The guidance allows entities to choose between two methods to measure progress toward complete satisfaction of a performance obligation:

1. Output methods - recognize revenue on the basis of direct measurements of the value to the customer of the goods or services transferred to date relative to the remaining goods or services promised under the contract (e.g. surveys of performance completed to date, appraisals of results achieved, milestones reached, time elapsed, and units of produced or units delivered); and
2. Input methods - recognize revenue on the basis of the entity's efforts or inputs to the satisfaction of a performance obligation (e.g., resources consumed, labor hours expended, costs incurred, or time elapsed) relative to the total expected inputs to the satisfaction of that performance obligation.

Licenses of intellectual property: If the license to the Company's intellectual property is determined to be distinct from the other performance obligations identified in the arrangement, the Company recognizes revenue from non-refundable, up-front fees allocated to the license when the license is transferred to the customer and the customer is able to use and benefit from the license. For licenses that are bundled with other promises, the Company utilizes judgment to assess the nature of the combined performance obligation to determine whether the combined

performance obligation is satisfied over time or at a point in time and, if over time, the appropriate method of measuring progress for purposes of recognizing revenue from non-refundable, up-front fees. The Company evaluates the measure of progress each reporting period and, if necessary, adjusts the measure of performance and related revenue recognition.

Milestone payments: At the inception of each arrangement that includes development, regulatory or commercial milestone payments, the Company evaluates whether the milestones are considered probable of being reached and estimates the amount to be included in the transaction price. ASC 606 suggests two alternatives to use when estimating the amount of variable consideration: the expected value method and the most likely amount method. Under the expected value method, an entity considers the sum of probability-weighted amounts in a range of possible consideration amounts. Under the most likely amount method, an entity considers the single most likely amount in a range of possible consideration amounts. Whichever method is used, it should be consistently applied throughout the life of the contract; however, it is not necessary for the Company to use the same approach for all contracts. The Company uses the most likely amount method for development and regulatory milestone payments. If it is probable that a significant revenue reversal would not occur, the associated milestone value is included in the transaction price. The transaction price

is then allocated to each performance obligation on a relative stand-alone selling price basis. The Company recognizes revenue as or when the performance obligations under the contract are satisfied. At the end of each subsequent reporting period, the Company re-evaluates the probability or achievement of each such milestone and any related constraint, and if necessary, adjusts its estimates 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.

Royalties: For arrangements that include sales-based royalties, including milestone payments based on the level of sales, and 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).

Up-front Fees: Depending on the nature of the agreement, up-front payments and fees may be recorded as deferred revenue upon receipt or when due and may require deferral of revenue recognition to a future period until the Company performs its obligations under these arrangements. Amounts payable to the Company are recorded as accounts receivable when the Company's right to consideration is unconditional. The Company does not assess whether a contract has a significant financing component if the expectation at contract inception is such that the period between payment by the customer and the transfer of the promised goods or services to the customer will be one year or less.

Impact of Adopting ASC 606 on the Consolidated Financial Statements

We adopted ASC 606 using the modified retrospective method. The cumulative effect of applying the new guidance to all contracts with customers that were not completed as of January 1, 2018 was recorded as an adjustment to accumulated deficit as of the adoption date. We elected to apply a practical expedient to reflect the aggregate effect of all modifications that occurred before January 1, 2018 when identifying the satisfied and unsatisfied performance obligations, determining the transaction price, and allocating the transaction price to the satisfied and unsatisfied performance obligations. The estimated effect of applying this practical expedient results in a slower recognition of the transaction price, as more consideration is allocated to performance obligations originally identified as a material right at contract inception. As a result of applying the modified retrospective method to adopt the new revenue guidance, the following adjustments were made to the consolidated balance sheet as of January 1, 2018 (in thousands):

	As Reported December 31, 2017	ASC 606 Adjustment	Adjusted January 1, 2018
Consolidated Balance Sheet Data:			
Current portion, deferred revenue	\$4,485	\$ (2,986)	\$1,499
Deferred revenue, net of current portion	7,748	(5,870)	1,878
Accumulated deficit	\$(1,026,476)	\$ 8,856	\$(1,017,620)

Impact of ASC 606 on the Consolidated Financial Statements

In accordance with Topic 606, the disclosure of the impact of adoption to our consolidated statements of income and balance sheets was as follows (in thousands):

Year ended December 31, 2018			
As Reported	Adjustments	Notes	Balances without

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	Under ASC 606		Adoption of ASC 606	
Consolidated Balance Sheet Data:				
Current portion, deferred revenue	1,814	1,001	(1)	2,815
Deferred revenue, net of current portion	1,165	4,695	(1)	5,860
Accumulated deficit	(1,177,311)	(5,696)	(2)	(1,183,007)

Consolidated Statement of Operations Data:

Research and development revenue	\$19,475	\$ 3,160	(3)	\$22,635
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- (1) Adjustment to deferred revenue to reflect recognition of revenue under ASC 605 primarily attributable to the change in the timing of revenue recognition for amounts received under the Incyte Collaboration Agreement, see Note 14.
- (2) Adjustment to accumulated deficit to reflect the reversal of the cumulative transition adjustment and the difference in revenue from ASC 606 to ASC 605, see Note 14.
- (3) Adjustment to reflect the difference in revenue recognition from ASC 606 to ASC 605 primarily attributable to the change in recognition of an upfront fee related to the GSK License and Amended Supply Agreements, see Note 14.

(l) Foreign Currency Transactions

Gains and losses from our foreign currency based accounts and transactions, such as those resulting from the translation and settlement of receivables and payables denominated in foreign currencies, are included in the consolidated statements of operations within other (expense) income. We do not currently use derivative financial instruments to manage the risks associated with foreign currency fluctuations. We recorded a foreign currency loss of \$2.2 million for the year ended December 31, 2018, a foreign currency gain of \$1.9 million for the year ended December 31, 2017, and a foreign currency loss of \$2.1 million for the year ended December 31, 2016.

(m) Research and Development

Research and development expenses include the costs associated with our internal research and development activities, including salaries and benefits, share-based compensation, occupancy costs, clinical manufacturing costs, related administrative costs, and research and development conducted for us by outside advisors, such as sponsored university-based research partners and clinical study partners. We account for our clinical study costs by estimating the total cost to treat a patient in each clinical trial and recognizing this cost based on estimates of when the patient receives treatment, beginning when the patient enrolls in the trial. Research and development expenses also include the cost of clinical trial materials shipped to our research partners. Research and development costs are expensed as incurred.

(n) Share-Based Compensation

We account for share-based compensation in accordance with the provisions of ASC 718, Compensation—Stock Compensation and ASC 505-50, Equity-Based Payments to Non-Employees. Share-based compensation expense is recognized based on the estimated grant date fair value. Compensation cost is recognized on a straight-line basis over the requisite service period of the award. Forfeitures are recognized as they occur. The non-cash charge to operations for non-employee awards with vesting or other performance criteria is affected each reporting period by changes in the fair value of our common stock. See Note 12 for a further discussion on share-based compensation.

(o) Income Taxes

Income taxes are accounted for under the asset and liability method with deferred tax assets and liabilities recognized for the future tax consequences attributable to differences between the financial statement carrying amounts of existing assets and liabilities and their respective tax basis and net operating loss and tax credit carryforwards. Deferred tax assets and liabilities are measured using enacted tax rates expected to apply to taxable income in the years in which such items are expected to be reversed or settled. The effect on deferred tax assets and liabilities of a change in tax rates is recognized in the consolidated statement of operations in the period that includes the enactment date. Deferred tax assets are recognized when they are more likely than not expected to be realized.

The Tax Cuts and Jobs Act (“the Act”) was enacted on December 22, 2017. The Act reduces the US federal corporate tax rate from 34% to 21%, requires companies to pay a one-time transition tax on earnings of certain foreign subsidiaries that were previously tax deferred and creates new taxes on certain foreign sourced earnings. On December 22, 2017, the Securities and Exchange Commission issued guidance under Staff Accounting Bulletin No. 118, Income Tax Accounting Implications of the Tax Cuts and Jobs Act (“SAB 118”) directing taxpayers to consider the impact of the U.S. legislation as “provisional” when it does not have the necessary information available, prepared or analyzed (including computations) in reasonable detail to complete its accounting for the change in tax law.

As of December 31, 2018, we have completed our accounting for the tax effects of enactment of the Act, including the impacts described below.

The impacts of the Act relate to the reduction in the U.S. corporate income tax rate to 21 percent, which resulted in re-measuring our deferred tax assets and liabilities using the new 21 percent federal tax rate. This did not result in any net tax expense or benefit as there were corresponding and offsetting impacts to our deferred tax asset valuation allowance. For the years ended December 31, 2018 and 2017, we recognized no transition tax as a result of our accumulated losses since inception of our foreign subsidiaries, beginning in 2002. We have elected to account for global intangible low-taxed income (“GILTI”) as a period expense. During the year ended December 31, 2018 we recognized no changes to the 2017 enactment-date provisional amounts.

(p) Net Loss Per Share

Basic income and loss per common share is calculated by dividing the net loss attributable to common stockholders by the weighted average number of common shares outstanding (including common shares issuable under our Directors' Deferred Compensation Plan). Diluted income per common share is calculated by dividing net income attributable to common stockholders by the weighted average number of common shares outstanding (including common shares issuable under our Directors' Deferred Compensation Plan) plus the dilutive effect of outstanding instruments such as warrants, stock options, non-vested shares, convertible preferred stock, and convertible notes. Because we reported a net loss attributable to common stockholders for all periods presented, diluted loss per common share is the same as basic loss per common share, as the effect of utilizing the fully diluted share count would have reduced the net loss per common share. Therefore, the following potentially dilutive securities have been excluded from the computation of diluted weighted average shares outstanding as of December 31, 2018, 2017, and 2016, as they would be anti-dilutive:

	Year Ended		
	2018	2017	2016
Warrants	2,900,000	4,351,450	4,351,450
Stock options	18,613,822	14,366,787	11,693,400
Nonvested shares	2,213,967	1,313,550	1,942,476
Series A-1 convertible preferred stock	333,333	333,333	333,333
Series C-1 convertible preferred stock	18,459,000	-	-

(q) Goodwill

Goodwill represents the excess of cost over the fair value of net assets of businesses acquired. Goodwill is not amortized, but instead tested for impairment at least annually. Annually we assess whether there is an indication that goodwill is impaired, or more frequently if events and circumstances indicate that the asset might be impaired during the year. We perform our annual impairment test as of October 31 of each year. The first step of our impairment analysis compares the fair value of our reporting units to their net book value to determine if there is an indicator of impairment. We operate as two reporting units. ASC 350, Intangibles, Goodwill and Other states that if the carrying value of a reporting unit is negative, the second step of the impairment test shall be performed to measure the amount of impairment loss, if any, if qualitative factors indicate that it is more likely than not that a goodwill impairment exists. No goodwill impairment has been recognized for the periods presented.

(r) In-process Research and Development

Acquired in-process research and development ("IPR&D") represents the fair value assigned to research and development assets that have not reached technological feasibility. The value assigned to acquired IPR&D is determined by estimating the costs to develop the acquired technology into commercially viable products, estimating the resulting revenue from the projects, and discounting the net cash flows to present value. The revenue and cost projections used to value acquired IPR&D are, as applicable, reduced based on the probability of success of developing a new drug. 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 us and our competitors. The rates utilized to discount the net cash flows to their present value are commensurate with the stage of development of the projects and uncertainties in the economic estimates used in the projections. Upon the acquisition of IPR&D, we complete an assessment of whether our acquisition constitutes the purchase of a single asset or a group of assets. We consider multiple factors in this assessment, including the nature of the technology acquired, the presence or absence of separate cash flows, the development process and stage of completion, quantitative significance and our rationale

for entering into the transaction.

If we acquire an asset or group of assets that do not meet the definition of a business under applicable accounting standards, then the acquired IPR&D is expensed on its acquisition date. Future costs to develop these assets are recorded to research and development expense as they are incurred.

We review amounts capitalized as acquired IPR&D for impairment at least annually, as of October 31, or whenever events or changes in circumstances indicate that the carrying value of the assets might not be recoverable. When performing our impairment assessment, we have the option to first assess qualitative factors to determine whether it is necessary to estimate the fair value of our acquired IPR&D. If we elect this option and believe, as a result of the qualitative assessment, that it is more-likely-than-not that the fair value of our acquired IPR&D is less than its carrying amount, we estimate the fair value using the same methodology as described above. If the carrying value of our acquired IPR&D exceeds its fair value, then the intangible asset is written-down to its fair value. Alternatively, we may elect to not first assess qualitative factors and immediately estimate the fair value of our acquired IPR&D. No IPR&D impairments were recognized for the years presented.

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(s) Accounting for Asset Retirement Obligations

We record the fair value of an asset retirement obligation as a liability in the period in which we incur a legal obligation associated with the retirement of tangible long-lived assets that result from the acquisition, construction, development, and/or normal use of the assets. A legal obligation is a liability that a party is required to settle as a result of an existing or enacted law, statute, ordinance, or contract. We are also required to record a corresponding asset that is depreciated over the life of the asset. Subsequent to the initial measurement of the asset retirement obligation, the obligation will be adjusted at the end of each period to reflect the passage of time (accretion) and changes in the estimated future cash flows underlying the obligation. Changes in the liability due to accretion are charged to the consolidated statement of operations, whereas changes due to the timing or amount of cash flows are an adjustment to the carrying amount of the related asset. Our asset retirement obligations primarily relate to the expiration of our facility lease and anticipated costs to be incurred based on our lease terms.

(t) Long-lived Assets

If required based on certain events and circumstances, recoverability of assets to be held and used, other than goodwill and intangible assets not being amortized, is measured by a comparison of the carrying amount of an asset to the undiscounted future net cash flows expected to be generated by the asset or asset group. If the carrying amount of an asset exceeds its estimated future undiscounted cash flows, an impairment charge is recognized for the amount by which the carrying amount of the asset exceeds the fair value of the asset. Authoritative guidance requires companies to separately report discontinued operations and extends that reporting to a component of an entity that either has been disposed of (by sale, abandonment, or in a distribution to owners) or is classified as held for sale. Assets to be disposed of are reported at the lower of the carrying amount or fair value less costs to sell.

(u) Recent Accounting Pronouncements

Recently Issued and Adopted

In May 2014, the FASB issued Accounting Standards Update (“ASU”) No. 2014-09, Revenue from Contracts with Customers, (Topic 606) (“ASU 2014-09”). ASU 2014-09 amends the guidance for the recognition of revenue from contracts with customers to transfer goods and services. The FASB subsequently issued additional, clarifying standards to address issues arising from the implementation of the new revenue recognition standard. The new revenue recognition standard and clarifying standards require an entity to recognize revenue when control of promised goods or services is transferred to the customer at an amount that reflects the consideration to which the entity expects to be entitled in exchange for those goods or services. We adopted this new standard on January 1, 2018, by using the modified-retrospective method. See Note 2 (k) and Note 14.

In January 2017, the FASB issued ASU No. 2017-01, Business Combinations (Topic 805): Clarifying the Definition of a Business (“ASU 2017-01”), which provides guidance regarding the definition of a business, with the objective of adding guidance to assist entities with evaluating whether transactions should be accounted for as acquisitions (or disposals) of assets or businesses. We adopted ASU 2017-01 on January 1, 2018 and will apply it prospectively. The impact on our consolidated financial statements in future periods will depend on the specific facts and circumstances of future transactions.

In May 2017, the FASB issued ASU No. 2017-09, Compensation – Stock Compensation (Topic 718) Scope of Modification Accounting (“ASU 2017-09”). The amendments in ASU 2017-09 provide guidance about which changes to the terms or conditions of a share-based payment award require an entity to apply modification accounting in Topic 718. We adopted ASU 2017-09 on January 1, 2018. The guidance will be applied prospectively to awards modified on or after the adoption date. The adoption of ASU 2017-09 did not have any impact on our consolidated financial statements.

Recently Issued, Not Yet Adopted

In February 2016, the FASB issued ASU 2016-02, Leases (Topic 842) (“ASU 2016-02”) which supersedes Topic 840, Leases. ASU 2016-02 requires lessees to recognize a right-of-use asset and a lease liability on their balance sheets for all leases with terms greater than twelve months. Based on certain criteria, leases will be classified as either financing or operating, with classification affecting the pattern of expense recognition in the income statement. For leases with a term of 12 months or less, a lessee is permitted to make an accounting policy election by class of underlying asset not to recognize lease assets and lease liabilities. If a lessee makes this election, it should recognize lease expense for such leases generally on a straight-line basis over the lease term. ASU 2016-02 is effective for us on January 1, 2019, and requires a modified retrospective transition approach. The modified retrospective approach includes a number of optional practical expedients primarily focused on leases that commenced before the effective date of Topic 842, including continuing to account for leases that commence before the effective date in accordance with previous guidance, unless the lease is modified.

In July 2018, the FASB issued ASU 2018-11, which provides companies an additional, optional, transition method. This optional method allows companies to initially apply the standard at the adoption date and recognize a cumulative-effect adjustment to the opening balance of retained earnings in the period of adoption. We have elected this transition approach, using a cumulative-effect adjustment on the effective date of the standard, with comparative periods presented in accordance with the existing guidance in ASC 840. We adopted the standard on January 1, 2019 and have used the effective date as our date of initial application. We expect to take advantage of certain available expedients by electing the transition package of practical expedients permitted within ASU 2016-02, which allows us to not reassess previous accounting conclusions around whether arrangements are, or contain, leases, the classification of leases, and the treatment of initial direct costs.

We are still assessing the impact of adopting Topic 842, and currently expect to recognize additional lease liabilities and right-of-use assets as of January 1, 2019, related to our operating leases. Refer to Note 16 for details on our current lease arrangements. We further expect to provide enhanced new disclosures about our leasing arrangements in our financial statements for future periods. We do not expect that the new standard will have a material impact on our consolidated statement of operations or cash flows.

In January 2017, the FASB issued ASU 2017-04, Intangibles – Goodwill and Other (Topic 350) (“ASU 2017-04”) that will eliminate the requirement to calculate the implied fair value of goodwill to measure a goodwill impairment charge. Instead, an impairment charge will be based on the excess of a reporting unit’s carrying amount over its fair value. The guidance is effective for the Company in the first quarter of fiscal 2020. Early adoption is permitted. We do not anticipate the adoption of this guidance to have a material impact on our consolidated financial statements, absent any goodwill impairment.

In June 2018, the FASB issued ASU No. 2018-07, Compensation – Stock Compensation (Topic 718) Improvements to Nonemployee Share-Based Payment Accounting (“ASU 2018-07”). The amendments in ASU 2018-07 simplify the accounting for share-based payments to nonemployees by aligning it with the accounting for share-based payments to employees, with certain exceptions. The standard will be effective for fiscal years beginning after December 15, 2018, and interim periods within those fiscal years. We are currently evaluating the impact of adoption of ASU 2018-07 on our consolidated financial statements.

In August 2018, the FASB issued ASU No. 2018-13, Fair Value Measurement (Topic 820): Disclosure Framework - Changes to the Disclosure Requirements for Fair Value Measurement (“ASU 2018-13”). The amendments in ASU 2018-13 modify the disclosure requirements of fair value measurements. The standard will be effective for fiscal years beginning after December 15, 2019, and interim periods within those fiscal years, with early adoption permitted. Certain disclosures are required to be applied on a retrospective basis and others on a prospective basis. We are currently evaluating the impact of adoption of ASU 2018-13 on our financial statement disclosures.

In August 2018, the FASB issued ASU No. 2018-15, Intangibles - Goodwill and Other - Internal-Use Software (Subtopic 350-40): Customer's Accounting for Implementation Costs Incurred in a Cloud Computing Arrangement that is a Service Contract (“ASU 2018-15”). The amendments in ASU 2018-15 align the requirements for capitalizing implementation costs incurred in a hosting arrangement that is a service contract with the requirements for capitalizing

implementation costs incurred to develop or obtain internal-use software. The standard will be effective for fiscal years beginning after December 15, 2019, and interim periods within those fiscal years, with early adoption permitted. ASU 2018-15 is required to be applied either retrospectively or prospectively to all implementation costs incurred after the date of adoption. We are currently evaluating the impact of adoption of ASU 2018-07 on our consolidated financial statements.

In November 2018, the FASB issued ASU No. 2018-18, Collaborative Arrangements (Topic 808): Clarifying the Interaction between Topic 808 and Topic 606 (“ASU 2018-18”). ASU 2018-18 (1) clarifies that certain transactions between collaborative arrangement participants should be accounted for under ASC 606, when the collaborative arrangement participant is a customer in the context of a unit of account, (2) adds unit-of-account guidance in ASC 808 to align with ASC 606 when an entity is assessing whether the collaborative arrangement, or a part of the arrangement, is within the scope of ASC 606, (3) precludes presenting transactions together with revenue when those transactions involve collaborative arrangement participants that are not directly related to third parties and are not customers. The standard will be effective for fiscal years beginning after December 15, 2019, and interim periods within those fiscal years, with early adoption permitted. We are currently evaluating the impact of adoption of ASU 2018-18 on our consolidated financial statements.

No other new accounting pronouncement issued or effective during the year ended December 31, 2018 had or is expected to have a material impact on our consolidated financial statements or disclosures.

(3) Business Acquisitions

4-Antibody

On January 10, 2014, we entered into a Share Exchange Agreement (the “Share Exchange Agreement”) providing for our acquisition of all of the outstanding capital stock of Agenus Switzerland Inc. (formerly known as 4-Antibody AG) (“4-AB”), from the shareholders of 4-AB (the “4-AB Shareholders”). The transaction closed on February 12, 2014 (the “Closing Date”). In exchange for their shares, the 4-AB Shareholders received an aggregate of 3,334,079 shares of our common stock paid upon closing and valued at \$10.1 million. Contingent milestone payments of up to \$40.0 million (the “contingent purchase price consideration”), payable in cash or shares of our common stock at our option, are due to the 4-AB Shareholders as follows: (i) \$20.0 million upon our market capitalization exceeding \$300.0 million for 10 consecutive trading days prior to the earliest of (a) the fifth anniversary of the Closing Date (b) the sale of the 4-AB or (c) the sale of Agenus; (ii) \$10.0 million upon our market capitalization exceeding \$750.0 million for 30 consecutive trading days prior to the earliest of (a) the tenth anniversary of the Closing Date (b) the sale of 4-AB, or (c) the sale of Agenus, and (iii) \$10.0 million upon our market capitalization exceeding \$1.0 billion for 30 consecutive trading days prior to the earliest of (a) the tenth anniversary of the Closing Date, (b) the sale of 4-AB, or (c) the sale of Agenus. We assigned an acquisition date fair value of \$9.7 million to the contingent purchase price consideration. During January 2015, the first milestone noted above was achieved. This acquisition provided us with the Retrocyte Display technology platform for the rapid discovery and optimization of fully-human and humanized monoclonal antibodies against a wide array of molecular targets and a portfolio of CPM antibodies.

PhosImmune Inc.

On December 23, 2015 (the “PhosImmune Closing Date”), we entered into a Purchase Agreement with PhosImmune Inc., a privately-held Virginia corporation (“PhosImmune”), the securityholders of PhosImmune (the “PhosImmune Securityholders”) and Fanelli Haag PLLC, as representative of the PhosImmune Securityholders providing for the acquisition of all outstanding securities of PhosImmune. On the PhosImmune Closing Date, in exchange for their shares, the PhosImmune Securityholders received \$2.5 million in cash and an aggregate of 1,631,521 of our common stock paid upon closing and valued at \$7.4 million. Contingent milestone payments up to \$35.0 million payable in cash and/or stock at our option are due as follows: (i) \$5.0 million upon the closing trading price of our common stock equals or exceeds \$8.00 for 60 consecutive trading days prior to the earlier of (a) the fifth anniversary of the PhosImmune Closing Date or (b) the sale of Agenus; (ii) \$15.0 million if the closing trading price of our common stock equals or exceeds \$13.00 for 60 consecutive trading days prior to the earlier of (a) the tenth anniversary of the PhosImmune Closing Date or (b) the sale of Agenus; and (iii) \$15.0 million if the closing trading price of our common stock equals or exceeds \$19.00 for 60 consecutive trading days prior to the earlier of (a) the tenth anniversary of the PhosImmune Closing Date or (b) the sale of Agenus. We assigned an acquisition date fair value of \$2.5 million to the contingent purchase price consideration. This acquisition expands our I-O pipeline and strengthens our neoantigen capabilities to enable the development of best-in-class cancer vaccines and other novel therapies.

(4) Asset Purchase Agreements

Celexion, LLC

On April 7, 2015 (the “Celexion Closing Date”), we entered into an Asset Purchase Agreement (the “Celexion Purchase Agreement”) with Celexion, LLC (“Celexion”) and each of the members of Celexion, pursuant to which, we acquired Celexion’s SECANT yeast display antibody discovery platform, its full-length IgG antibody library, its technology for the discovery of molecules targeting cell membrane-associated antigens, and certain other related intellectual property assets (collectively, the “Purchased Assets”). As consideration for the Purchased Assets, on the Celexion Closing Date we paid Celexion \$1.0 million in cash and issued Celexion 574,140 shares of our common stock valued at approximately \$5.23 per share. As additional consideration for the Purchased Assets, we agreed under the Celexion Purchase Agreement to pay to Celexion (i) \$1.0 million in cash payable on each of the 9-month and 18-month anniversaries of the Celexion Closing Date and (ii) \$4.0 million on each of the 12-month and 24-month anniversaries of the Celexion Closing Date payable at our discretion in cash, shares of our common stock, or any combination thereof. If we elect to pay any of the additional consideration in shares of our common stock, such shares will be issued at a price per share equal to the simple average of the daily closing volume weighted average price over the 20 trading days preceding the date of issuance. We agreed to file one or more registration statements under the Securities Act to cover the resale of all shares issued as consideration under the Celexion Purchase Agreement. In May 2015, we filed a registration statement covering the resale of the 574,140 shares issued to Celexion on the Celexion Closing Date, and the SEC declared the registration statement effective in June 2015. This transaction was accounted for as an asset acquisition in accordance with ASC 805 Business Combinations. In accordance with ASC 730 Research and Development, the purchase price of approximately \$13.2 million was recorded as research and development expense in our consolidated statement of operations and comprehensive loss for the year December 31, 2015 as the IPR&D was deemed to have no future alternative use.

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On November 9, 2017 we made the final payment under the Celexion Purchase Agreement. We issued to Celexion 999,317 shares of our common stock based on the preceding 20 trading day average of approximately \$4.10 per share. The closing price of our common stock on November 9, 2017 was \$3.55 per share. As such, we recorded a gain of approximately \$550,000 at issuance. Also on November 9, 2017, we filed a registration statement covering the sale of the 999,317 shares issued to Celexion. The SEC declared the registration statement effective in January 2018.

(5) Goodwill and Acquired Intangible Assets

The following table sets forth the changes in the carrying amount of goodwill for year ended December 31, 2018 (in thousands):

Balance, December 31, 2017	\$23,049
Effect of foreign currency	(124)
Balance, December 31, 2018	\$22,925

Acquired intangible assets consisted of the following at December 31, 2018 and 2017 (in thousands):

As of December 31, 2018				
Amortization				
	period	Gross carrying	Accumulated	Net carrying
	(years)	amount	amortization	amount
Intellectual Property	7-15 years	\$ 16,509	\$ (6,147)	\$ 10,362
Trademarks	4.5 years	820	(820)	-
Other	2-6 years	569	(505)	64
In-process research and development	Indefinite	1,912	—	1,912
Total		\$ 19,810	\$ (7,472)	\$ 12,338

As of December 31, 2017				
Amortization				
	period	Gross carrying	Accumulated	Net carrying
	(years)	amount	amortization	amount
Intellectual Property	7-15 years	\$ 16,545	\$ (4,290)	\$ 12,255
Trademarks	4.5 years	826	(711)	115
Other	2-6 years	570	(461)	109
In-process research and development	Indefinite	1,928	—	1,928
Total		\$ 19,869	\$ (5,462)	\$ 14,407

The weighted average amortization period of our finite-lived intangible assets is approximately 9 years. Amortization expense for the years ended December 31, 2018, 2017, and 2015 was \$2.0 million, \$2.3 million and \$2.2 million, respectively. Amortization expense related to acquired intangibles is estimated at \$1.9 million for 2019, \$1.9 million for each of 2020, 2021, and 2022 and \$1.4 million for 2023.

The acquired IPR&D asset relates to the six pre-clinical antibody programs acquired in the Agenus Switzerland transaction. IPR&D acquired in a business combination is capitalized at fair value until the underlying project is completed and is subject to impairment testing. Once the project is completed, the carrying value of IPR&D is amortized over the estimated useful life of the asset. Post-acquisition research and development expenses related to the acquired IPR&D are expensed as incurred.

(6) Investments

Cash Equivalents and Short-term Investments

Cash equivalents and short-term investments consisted of the following as of December 31, 2018 and 2017 (in thousands):

	December 31, 2018		December 31, 2017	
	Estimated		Estimated	
	Cost	Fair Value	Cost	Fair Value
Institutional Money Market Funds	\$29,948	\$ 29,948	\$57,036	\$ 57,036

As a result of the short-term nature of our investments, there were minimal unrealized holding gains or losses as of December 31, 2018, 2017 and 2016.

All the investments listed above have been classified as cash equivalents on our consolidated balance sheet as of December 31, 2018 and 2017, respectively.

(7) Property, Plant and Equipment

Property, plant and equipment, net as of December 31, 2018 and 2017 consist of the following (in thousands):

			Estimated
			Depreciable
	2018	2017	Lives
Land	\$2,230	\$2,230	Indefinite
Building and building improvements	5,451	4,682	35 years
Furniture, Fixtures, and other	3,984	5,409	3 to 10 years
Laboratory and manufacturing equipment	18,993	17,438	4 to 10 years
Leasehold improvements	24,525	23,415	2 to 12 years
Software and computer equipment	8,001	7,034	3 years
	63,184	60,208	
Less accumulated depreciation and amortization	(38,068)	(34,029)	
Total	\$25,116	\$26,179	

(8) Income Taxes

We are subject to taxation in the U.S. and in various state, local, and foreign jurisdictions. We remain subject to examination by U.S. Federal, state, local, and foreign tax authorities for tax years 2015 through 2018. With a few exceptions, we are no longer subject to U.S. Federal, state, local, and foreign examinations by tax authorities for the tax year 2014 and prior. However, net operating losses from the tax year 2014 and prior would be subject to examination if and when used in a future tax return to offset taxable income. Our policy is to recognize income tax related penalties and interest, if any, in our provision for income taxes and, to the extent applicable, in the corresponding income tax assets and liabilities, including any amounts for uncertain tax positions.

As of December 31, 2018, we had available net operating loss carryforwards of \$795.7 million and \$300.4 million for Federal and state income tax purposes, respectively, which are available to offset future Federal and state taxable income, if any, \$85.3 million of these Federal net operating loss carryforwards do not expire, while the remaining net operating loss carryforwards expire between 2019 and 2038. Our ability to use these net operating losses is limited by change of control provisions under Internal Revenue Code Section 382 and may expire unused. In addition, we have \$8.9 million and \$11.9 million of Federal and state research and development credits, respectively, available to offset future taxable income. These Federal and state research and development credits expire between 2019 and 2038 and 2019 and 2029, respectively. Additionally, we have \$0.2 million of state investment tax credits, available to offset future taxable income and expire between 2019 and 2021. We also have foreign income tax net operating loss carryforwards of approximately \$1.8 million which are available to offset future foreign taxable income, if any, and

expire between 2019 and 2024. The potential impacts of such provisions are among the items considered and reflected in management's assessment of our valuation allowance requirements.

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The tax effect of temporary differences and net operating loss and tax credit carryforwards that give rise to significant portions of the deferred tax assets and deferred tax liabilities as of December 31, 2018 and 2017 are presented below (in thousands).

	2018	2017
Deferred tax assets:		
U.S. Federal and State net operating loss carryforwards	\$ 182,557	\$ 185,535
Foreign net operating loss carryforwards	1,524	16,209
Research and development tax credits	18,507	19,597
Share-based compensation	4,824	8,249
Intangible Assets	36,217	—
Interest expense carryforward	6,555	—
Other	4,882	6,221
Total deferred tax assets	255,066	235,811
Less: valuation allowance	(254,315)	(232,443)
Net deferred tax assets	751	3,368
Foreign intangible assets	(1,063)	(1,178)
Other	(406)	(2,782)
Deferred tax liabilities	(1,469)	(3,960)
Net deferred tax liability	\$(718)	\$(592)

In assessing the realizability of deferred tax assets, we consider whether it is more likely than not that some portion or all of the deferred tax assets will not be realized. The ultimate realization of deferred tax assets is dependent upon the generation of future taxable income during the periods in which the net operating loss and tax credit carryforwards can be utilized or the temporary differences become deductible. We consider projected future taxable income and tax planning strategies in making this assessment. In order to fully realize the deferred tax asset, we will need to generate future taxable income sufficient to utilize net operating losses prior to their expiration. Based upon our history of not generating taxable income due to our business activities focused on product development, we believe that it is more likely than not that deferred tax assets will not be realized through future earnings. Accordingly, a valuation allowance has been established for deferred tax assets which will not be offset by the reversal of deferred tax liabilities. The valuation allowance on the deferred tax assets increased by \$21.9 million during the year ended December 31, 2018, while the valuation allowance decreased by \$63.1 during the year ended December 31, 2017, which was primarily related to the “Tax Cuts and Jobs Act”, which reduced the federal tax rate from 34% to 21%.

Income tax benefit was nil for the years ended December 31, 2018, 2017 and 2016. Income taxes recorded differed from the amounts computed by applying the U.S. Federal income tax rate of 21% in 2018 and 34% in 2017 and 2016 to loss before income taxes as a result of the following (in thousands).

	2018	2017	2016
Computed “expected” Federal tax benefit	\$(34,029)	\$(41,035)	\$(42,781)
(Increase) reduction in income taxes benefit resulting from:			
Change in valuation allowance	24,233	(63,868)	35,471
(Decrease) increase due to uncertain tax positions	7	—	(203)
Foreign income inclusion	11,089	—	—
State and local income benefit, net of Federal income tax	(11,708)	(4,561)	(3,452)

benefit			
Change in federal tax rate	—	104,764	—
Foreign rate differential	956	2,084	4,398
Other, net	9,452	2,616	6,567
Income tax benefit	\$—	\$—	\$—

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A reconciliation of the beginning and ending amount of gross unrecognized tax benefits is as follows (in thousands):

	2018	2017	2016
Balance, January 1	\$4,349	\$5,278	\$5,481
Increase related to current year positions	—	—	—
Increase (decrease) related to previously recognized positions	7	—	(203)
Decrease related to change in federal tax rate	—	(929)	—
Balance, December 31	\$4,356	\$4,349	\$5,278

These unrecognized tax benefits would all impact the effective tax rate if recognized. There are no positions which we anticipate could change within the next twelve months.

(9) Accrued and Other Current Liabilities

Accrued liabilities consist of the following as of December 31, 2018 and 2017 (in thousands):

	December 31, 2018	December 31, 2017
Payroll	\$ 8,770	\$ 7,790
Professional fees	3,528	2,021
Contract manufacturing costs	5,947	5,528
Research services	5,348	4,663
Other	958	1,567
Total	\$ 24,551	\$ 21,569

(10) Equity

Effective June 14, 2016, our certificate of incorporation was amended to increase the number of authorized shares of common stock from 140,000,000 to 240,000,000.

Under the terms and conditions of the Certificate of Designation creating the Series A-1 Preferred Stock, this stock is convertible by the holder at any time into our common stock, is non-voting, has an initial conversion price of \$94.86 per common share, subject to adjustment, and is redeemable by us at its face amount (\$31.6 million), plus any accrued and unpaid dividends. The Certificate of Designation does not contemplate a sinking fund. The Series A-1 Preferred Stock ranks senior to both our Series C-1 Convertible Preferred Stock and our common stock. In a liquidation, dissolution, or winding up of the Company, the Series A-1 Preferred Stock's liquidation preference must be fully satisfied before any distribution could be made to the holders of the common stock. Other than in such a liquidation, no terms of the Series A-1 Preferred Stock affect our ability to declare or pay dividends on our common stock as long as the Series A-1 Preferred Stock's dividends are accruing. The liquidation value of this Series A-1 Preferred stock is

equal to \$1,000 per share outstanding plus any accrued unpaid dividends. Dividends in arrears with respect to the Series A-1 Preferred Stock were approximately \$1.2 million or \$38.33 per share, and \$1.0 million, or \$31.79 per share, at December 31, 2018 and 2017, respectively.

In January 2008, we entered into a private placement agreement (the “January 2008 private placement”) pursuant to which we sold 1,451,450 shares of common stock for \$18.00 for each share sold. Investors also received (i) 10-year warrants to purchase, at an exercise price of \$18.00 per share, up to 1,451,450 shares of common stock and (ii) unit warrants to purchase, at an exercise price of \$18.00 per unit, contingent upon a triggering event as defined in the January 2008 private placement documents, (a) up to 1,451,450 shares of common stock and (b) additional 10-year warrants to purchase, at an exercise price of \$18.00 per share, up to 1,451,450 additional shares of common stock. In accordance with the terms of the January 2008 private placement, the 10-year warrants became exercisable for a period of 9.5 years as of July 9, 2008. Our private placement in April 2008 qualified as a triggering event, and therefore the unit warrants became exercisable for a period of eighteen months as of July 9, 2008. The unit warrants expired unexercised in January 2010. In February 2008, we filed, and the Securities and Exchange Commission (the “SEC”) declared effective, the required registration statement covering the resale of the 1,451,450 shares of common stock issued and the 1,451,450 shares issuable upon the exercise of the 10-year warrants issued in the January 2008 private placement. In connection with the January 2008 private placement, of the 1,451,450 warrants issued, 284,785 of the warrants were issued to Garo Armen, our CEO. These 10-year warrants expired unexercised in January 2018.

During September 2013, we sold approximately 3,333,000 shares of our common stock and warrants to purchase 1,000,000 shares of our common stock in a registered direct public offering raising net proceeds of approximately \$9.5 million, after deducting offering expenses. The common stock and warrants were sold in units, with each unit consisting of one share of common stock and a warrant to purchase 0.3 of a share of common stock. Subject to certain ownership limitations, the warrants became exercisable beginning 6 months following issuance and will expire five years from the date they become exercisable, at an exercise price of \$3.75 per share. The number of shares issuable upon exercise of the warrants and the exercise price of the warrants are adjustable in the event of stock splits, stock dividends, combinations of shares and similar recapitalization transactions. As of the year ended December 31, 2018 all warrants remain unexercised.

On January 9, 2015, in connection with the execution of the Collaboration Agreement, we also entered into the Stock Purchase Agreement (the "Stock Purchase Agreement") with Incyte Corporation, pursuant to which Incyte purchased approximately 7.76 million shares of our common stock (the "Shares") in February 2015 for an aggregate purchase price of \$35.0 million, or approximately \$4.51 per share. Under the Stock Purchase Agreement, we agreed to register the Shares for resale under the Securities Act of 1933, as amended (the "Securities Act"). Subsequently, we filed, and the SEC declared effective, a registration statement covering the resale of the 7,760,000 shares of our common stock issued. On February 14, 2017, we entered into an additional Stock Purchase Agreement (the "Additional Stock Purchase Agreement") with Incyte, pursuant to which Incyte purchased 10 million shares of our common stock (the "Additional Shares") at a purchase price of \$6.00 per share. Immediately following the transaction, Incyte owned approximately 18.1% of our outstanding shares. Under the Additional Stock Purchase Agreement, Incyte agreed not to dispose of any of the Additional Shares for a period of 12 months and to vote the Additional Shares in accordance with the recommendations of the Company's board of directors in connection with certain equity incentive plan or compensation matters for a period of 18 months, and we agreed to certain registration rights with respect to the Additional Shares. The parties also revised the existing standstill provision to permit Incyte's acquisition of the Additional Shares, but Incyte is precluded from acquiring any additional shares of our voting stock until December 31, 2019.

In September 2016, in accordance with the terms of the Technology Transfer and License Agreement with Iontas Limited ("Iontas"), we issued 157,513 shares of our common stock to Iontas valued at approximately \$887,000. In March 2017, we issued an additional 373,351 shares of our common stock, valued at approximately \$1.5 million, to Iontas in accordance with the terms of the Technology Transfer and License Agreement. Subsequently, we filed, and the SEC declared effective, a registration statement covering the resale of the 530,864 shares of our common stock issued.

In October 2017, we filed, and the SEC declared effective, a Registration Statement on Form S-3 (the "2017 Registration Statement"), covering the offering of up to \$250 million of common stock, preferred stock, warrants, debt securities and units. The 2017 Registration Statement included a prospectus covering the offering, issuance and sale of up to 15 million shares of our common stock from time to time in "at-the-market offerings" pursuant to a Controlled Equity OfferingSM sales agreement (the "Sales Agreement") entered into with Cantor Fitzgerald & Co. (the "Sales Agent") on October 30, 2017. Pursuant to the Sales Agreement, sales will be made only upon instructions by us to the Sales Agent, and we cannot provide any assurances that it will issue any shares pursuant to the Sales Agreement. On October 18, 2017, we exercised our right under that certain At Market Issuance Sales Agreement by and between us and MLV & Co. LLC, dated as of October 10, 2014 (the "2014 ATM Program") to terminate the 2014 ATM Program, which termination took effect upon the effectiveness of the 2017 Registration Statement. During the year ended December 31, 2018, we sold 1,920,368 shares of our common stock in at-the-market offerings under the Sales Agreement. We terminated the Sales Agreement with Cantor Fitzgerald & Co. in May 2018.

In May 2018 we entered into an At Market Issuance Sales Agreement (the "Agreement") with B. Riley FBR, Inc. ("BRFBR") with respect to an at-the-market offering program under which we may offer and sell, from time to time at our sole discretion, up to 20 million shares of our common stock through BRFBR as our sales agent. The issuance and sale of the shares under the Agreement are made pursuant to our 2017 Registration Statement. In December 2018, we

filed a prospectus supplement with the SEC in connection with the offer and sale of up to an additional 30 million shares from time to time pursuant to the Agreement. During the year ended December 31, 2018, we sold 15,878,320 shares of our common stock in at-the-market offerings under the Agreement.

(11) Series C-1 Convertible Preferred Stock

In October 2018, we entered into a Stock Purchase Agreement with certain institutional investors (the “Purchasers”), pursuant to which we issued and sold an aggregate of 18,459 shares of Series C-1 Convertible Preferred Stock (the “C-1 Preferred Shares”), at a purchase price of \$2,167 per share. Each C-1 Preferred Share is convertible into 1,000 shares of our common stock at an initial conversion price of \$2.167 per share of common stock, which represents a 10% premium over the prior day’s closing price on Nasdaq. The aggregate purchase price paid by the Purchasers C-1 Preferred Shares was approximately \$40,000,000. We received net proceeds of \$39.9 million after offering expenses.

The Stock Purchase Agreement requires us to register the resale of the Common Stock underlying the C-1 Preferred Shares (the “Conversion Shares”), which occurred in the fourth quarter of 2018.

The C-1 Preferred Shares have been classified as temporary or mezzanine equity on our Consolidated Balance Sheets in accordance with U.S. GAAP as the C-1 Convertible Preferred Shares contain deemed liquidation rights that are a contingent redemption feature not solely in the Company’s control.

Conversion

The C-1 Preferred Shares are convertible at the option of the stockholder into the number of shares of Common Stock determined by dividing the stated value of the C-1 Preferred Shares being converted by the conversion price of \$2.167, subject to adjustment for stock splits, reverse stock splits and similar recapitalization events. We will not effect any conversion of the C-1 Preferred Shares, and a stockholder shall not have the right to convert any portion of the C-1 Preferred Shares, to the extent that, after giving effect to the conversion such stockholder would beneficially own in excess of 9.99% of the number of shares of the Common Stock outstanding immediately after giving effect to the issuance of shares of Common Stock pursuant to a notice of conversion (the “Beneficial Ownership Limitation”). By written notice to us, a Purchaser may from time to time increase or decrease the Beneficial Ownership Limitation percentage not in excess of 19.99% of the number of shares of Common Stock outstanding immediately after giving effect to the issuance of the shares of Common Stock pursuant to a notice of conversion; provided that any such increase will not be effective until the sixty-first (61st) day after such notice is delivered to the us.

Voting

The C-1 Preferred Shares do not have voting rights. However, as long as any Preferred Shares are outstanding, we may not, without the affirmative vote of the holders of a majority of the then-outstanding C-1 Preferred Shares, (i) alter or change adversely the powers, preferences or rights given to the C-1 Preferred Shares or alter or amend the Certificate of Designation, amend or repeal any provision of, or add any provision to, our Certificate of Incorporation or bylaws, or file any articles of amendment, certificate of designations, preferences, limitations and relative rights of any series of preferred stock, if such action would adversely alter or change the preferences, rights, privileges or powers of, or restrictions provided for the benefit of the C-1 Preferred Shares, regardless of whether any of the foregoing actions shall be by means of amendment to the Certificate of Incorporation or by merger, consolidation or otherwise, (ii) issue further C-1 Preferred Shares or increase or decrease (other than by conversion) the number of authorized C-1 Preferred Shares, or (iii) enter into any agreement with respect to any of the foregoing.

Dividends

The C-1 Preferred Shares are entitled to receive dividends equal (on an as-if-converted-to-Common-Stock-basis, without regard to the Beneficial Ownership Limitation) to and in the same form, and in the same manner, as dividends (other than dividends in the form of Common Stock) actually paid on shares of Common Stock when, and if paid.

Liquidation

In any liquidation or dissolution of the Company, the C-1 Preferred Shares are entitled to participate in the distribution of assets, to the extent legally available for distribution, on a pari passu basis with the Common Stock.

Redemption

If at any time while the C-1 Preferred Shares are outstanding, a) the Company effects any merger, consolidation, stock sale or other business combination (other than such a transaction in which the Company is the surviving or continuing entity and its common stock is not exchanged for or converted into other securities, cash or property), b) the Company effects any sale of all or substantially all of its assets in one transaction or a series of related transactions, c) any tender

offer or exchange offer (whether by the Company or another person) is completed pursuant to which more than 50% of the common stock not held by the Company or is exchanged for or converted into other securities, cash or property, or d) the Company effects any reclassification of the common stock or any compulsory share exchange pursuant (other than as a result of a dividend, subdivision or combination covered above) to which the common stock is effectively converted into or exchanged for other securities, cash or property, (in any such case, a “Fundamental Transaction”) then, upon any subsequent conversion of the C-1 Preferred Shares, the holder shall have the right to receive, in lieu of the right to receive shares of common stock, for each share of common stock that would have been issued upon such conversion immediately prior to the occurrence of such Fundamental Transaction, the same kind and amount of securities, cash or property as it would have been entitled to receive upon the occurrence of such Fundamental Transaction if it had been, immediately prior to such Fundamental Transaction, the holder of the equivalent amount of common stock.

Registration Payment Arrangement

We were required to file a registration statement covering the resale of the full number of shares no later than 30 days after the closing of the agreement and must use commercially reasonable efforts to cause the registration statement to be declared effective no later than 90 days after the closing date (no review by the SEC) or in the event of a review by the SEC, 120 days after the closing date. We filed, and the SEC declared effective this registration statement during 2018. If the registration statement is not maintained we

must pay to each holder 1.0% of the holder's ratable interest in the aggregate purchase price on the day of the filing/maintenance failure and on every thirtieth day thereafter until the filing/maintenance failure is cured, up to a maximum of 6% (six months). We currently deem the likelihood that we will ever be required to make payments under this arrangement to be remote, and as such no contingent liability has been recorded in our Consolidated Balance Sheets.

(12) Share-based Compensation Plans

Our 1999 Equity Incentive Plan, as amended (the "1999 EIP") authorized awards of incentive stock options within the meaning of Section 422 of the Internal Revenue Code (the "Code"), non-qualified stock options, non-vested (restricted) stock, and unrestricted stock for up to 2.0 million shares of common stock (subject to adjustment for stock splits and similar capital changes and exclusive of options exchanged at the consummation of mergers) to employees and, in the case of non-qualified stock options, non-vested (restricted) stock, and unrestricted stock, to consultants and directors as defined in the 1999 EIP. The plan terminated on November 15, 2009. On March 12, 2009, our Board of Directors adopted, and on June 10, 2009, our stockholders approved, our 2009 Equity Incentive Plan (the "2009 EIP"). The 2009 EIP provides for the grant of incentive stock options intended to qualify under Section 422 of the Code, nonstatutory stock options, restricted stock, unrestricted stock and other equity-based awards, such as stock appreciation rights, phantom stock awards, and restricted stock units, which we refer to collectively as Awards, for up to 29.2 million shares of our common stock (subject to adjustment in the event of stock splits and other similar events). The Board of Directors appointed the Compensation Committee to administer the 1999 EIP and the 2009 EIP. No awards will be granted under the 2009 EIP after June 14, 2026.

On March 12, 2009, our Board of Directors adopted, and on June 10, 2009, our stockholders approved, the 2009 Employee Stock Purchase Plan (the "2009 ESPP") to provide eligible employees the opportunity to acquire our common stock in a program designed to comply with Section 423 of the Code. There are currently 166,666 shares of common stock reserved for issuance under the 2009 ESPP. Rights to purchase common stock under the 2009 ESPP are granted at the discretion of the Compensation Committee, which determines the frequency and duration of individual offerings under the plan and the dates when stock may be purchased. Eligible employees participate voluntarily and may withdraw from any offering at any time before the stock is purchased. Participation terminates automatically upon termination of employment. The purchase price per share of common stock in an offering is 85% of the lesser of its fair value at the beginning of the offering period or on the applicable exercise date and may be paid through payroll deductions, periodic lump sum payments, the delivery of our common stock, or a combination thereof. Unless otherwise permitted by the Board of Directors, no participant may acquire more than 3,333 shares of stock in any offering period. No participant is allowed to purchase shares under the 2009 ESPP if such employee would own or would be deemed to own stock possessing 5% or more of the total combined voting power or value of the Company. No offerings will be made under the 2009 ESPP after June 10, 2019, unless amended.

Our Director's Deferred Compensation Plan, as amended, permits each outside director to defer all, or a portion of, their cash compensation until their service as a director ends or until a specified date into a cash account or a stock account. There are 425,000 shares of our common stock reserved for issuance under this plan. As of December 31, 2018, 72,081 shares had been issued. Amounts deferred to a cash account will earn interest at the rate paid on one-year Treasury bills with interest added to the account annually. Amounts deferred to a stock account will be converted on a quarterly basis into a number of units representing shares of our common stock equal to the amount of compensation which the participant has elected to defer to the stock account divided by the applicable price for our common stock. The applicable price for our common stock has been defined as the average of the closing price of our common stock for all trading days during the calendar quarter preceding the conversion date as reported by The Nasdaq Capital Market. Pursuant to this plan, a total of 349,442 units, each representing a share of our common stock at a weighted average common stock price of \$4.79, had been credited to participants' stock accounts as of December 31, 2018. The compensation charges for this plan were immaterial for all periods presented.

On November 4, 2015, our Board of Directors adopted and approved our 2015 Inducement Equity Plan (the “2015 IEP”) in compliance with and in reliance on NASDAQ Listing Rule 5635(c)(4), which exempts inducement grants from the general requirement of the NASDAQ Listing Rules that equity-based compensation plans and arrangements be approved by stockholders. There are 1,500,000 shares of our common stock reserved for issuance under the 2015 IEP.

We primarily use the Black-Scholes option pricing model to value options granted to employees and non-employees, as well as options granted to members of our Board of Directors. All stock option grants have 10-year terms and generally vest ratably over a 3 or 4-year period. The non-cash charge to operations for the non-employee options with vesting or other performance criteria is affected each reporting period, until the non-employee options vest, by changes in the fair value of our common stock.

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The fair value of each option granted during the periods was estimated on the date of grant using the following weighted average assumptions:

	2018	2017	2016
Expected volatility	64 %	65 %	65 %
Expected term in years	6	4	4
Risk-free interest rate	2.8 %	1.7 %	1.0 %
Dividend yield	0 %	0 %	0 %

Expected volatility is based exclusively on historical volatility data of our common stock. The expected term of stock options granted is based on historical data and other factors and represents the period of time that stock options are expected to be outstanding prior to exercise. The risk-free interest rate is based on U.S. Treasury strips with maturities that match the expected term on the date of grant.

A summary of option activity for 2018 is presented below:

	Options	Price	Weighted Average Exercise Term (in years)	Remaining Contractual Term (in years)	Aggregate Intrinsic Value
Outstanding at December 31, 2017	14,366,787	\$ 4.22			
Granted	6,195,082	4.06			
Exercised	(272,493)	3.41			
Forfeited	(912,514)	4.04			
Expired	(763,040)	5.26			
Outstanding at December 31, 2018	18,613,822	\$ 4.15	7.31		\$1,320,643
Vested or expected to vest at December 31, 2018	18,613,822	\$ 4.15	7.31		\$1,320,643
Exercisable at December 31, 2018	10,083,270	\$ 4.24	5.94		\$2,577

The weighted average grant-date fair values of options granted during the years ended December 31, 2018, 2017, and 2016, was \$1.23, \$1.97, and \$4.65, respectively.

The aggregate intrinsic value in the table above represents the difference between our closing stock price on the last trading day of fiscal 2018 and the exercise price, multiplied by the number of in-the-money options that would have been received by the option holders had all option holders exercised their options on December 31, 2018 (the intrinsic value is considered to be zero if the exercise price is greater than the closing stock price). This amount changes based on the fair market value of our stock. The total intrinsic value of options exercised during the years ended December 31, 2018, 2017, and 2016, determined on the dates of exercise, was \$399,000, \$132,000, and \$445,000, respectively.

During 2018, 2017, and 2016, all options were granted with exercise prices equal to the market value of the underlying shares of common stock on the grant date other than certain awards dated March 31, 2016, March 2, 2018 and August 6, 2018. In March 2016 and March 2018, our Board of Directors approved certain awards subject to forfeiture in the event shareholder approval was not obtained to increase the shares available under our 2009 EIP. This approval was obtained in June 2016 and June 2018, respectively. Accordingly, these awards have a grant date of June 2016 and June 2018, respectively, with an exercise price as of the date the Board of Director's approved the awards in March 2016 and March 2018, respectively. In August 2018, our Board of Directors approved certain awards. However, the awards were not communicated until October 2018. Accordingly, these awards have a grant date of October 2018 with an exercise price as of the date the Board of Director's approved the awards in August 2018.

As of December 31, 2018, there was \$9.4 million of unrecognized share-based compensation expense related to stock options granted to employees and directors for which, if all milestones are achieved, will be recognized over a weighted average period of 2.4 years.

As of December 31, 2018, unrecognized expense for options granted to outside advisors for which performance (vesting) has not yet been completed but the exercise price of the option was known was approximately \$1.0 million. Such amount is subject to change each reporting period based upon changes in the fair value of our common stock, expected volatility, and the risk-free interest rate, until the outside advisor completes his or her performance under the option agreement.

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Certain employees and consultants have been granted non-vested stock. The fair value of non-vested market-based awards is calculated based on a Monte Carlo simulation as of the date of issuance. The fair value of other non-vested stock is calculated based on the closing sale price of our common stock on the date of issuance.

A summary of non-vested stock activity for 2018 is presented below:

	Nonvested	Weighted Average Grant Date Fair Value
	Shares	
Outstanding at December 31, 2017	1,313,550	\$ 2.91
Granted	1,043,432	3.70
Vested	(53,050)	3.77
Forfeited	(89,965)	4.21
Outstanding at December 31, 2018	2,213,967	\$ 3.20

As of December 31, 2018, there was \$3.2 million of unrecognized share-based compensation expense related to these non-vested shares for which, if all milestones are achieved, will be recognized over a period of 2.4 years. The total intrinsic value of shares vested during the years ended December 31, 2018, 2017, and 2016, was \$242,000, \$3.8 million, and \$2.4 million, respectively.

Cash received from option exercises and purchases under our 2009 ESPP for the years ended December 31, 2018, 2017, and 2016, was \$1.2 million, \$1.0 million, and \$1.2 million, respectively. We issue new shares upon option exercises, purchases under our 2009 ESPP, vesting of non-vested stock, and under the Director's Deferred Compensation Plan. During the years ended December 31, 2018, 2017, and 2016, 140,313 shares, 121,183 shares, and 121,228 shares, were issued under the 2009 ESPP, respectively. During the years ended December 31, 2018, 2017, and 2016, 53,050 shares, 1.1 million shares, and 570,037 shares, respectively, were issued as a result of the vesting of non-vested stock.

The impact on our results of operations from share-based compensation for the years ended December 31, 2018, 2017, and 2016, was as follows (in thousands).

	Year Ended		
	2018	2017	2016
Research and development	\$3,498	\$6,159	\$6,507
General and administrative	4,127	6,270	6,681
Total share-based compensation expense	\$7,625	\$12,429	\$13,188

(13) License, Research, and Other Agreements

In May 2001, we entered into a license agreement with the University of Connecticut Health Center (“UConn”), which was amended in March 2003 and June 2009. Through the license agreement, we obtained an exclusive license to patent rights resulting from inventions discovered under a research agreement that was effective from February 1998 until December 2006. The term of the license agreement ends when the last of the licensed patents expires (2024) or becomes no longer valid. UConn may terminate the agreement: (1) if, after 30 days written notice for breach, we continue to fail to make any payments due under the license agreement, or (2) we cease to carry on our business related to the patent rights or if we initiate or conduct actions in order to declare bankruptcy. We may terminate the agreement upon 90 days written notice. We are still required to make royalty payments on any obligations created prior to the effective date of termination of the license agreement. Upon expiration or termination of the license agreement due to breach, we have the right to continue to manufacture and sell products covered under the license agreement which are considered to be works in progress for a period of 6 months. The license agreement contains aggregate milestone payments of \$1.2 million for each product we develop covered by the licensed patent rights. These milestone payments are contingent upon regulatory filings, regulatory approvals and commercial sales of products. We have also agreed to pay UConn a royalty on the net sales of products covered by the license agreement as well as annual license maintenance fees beginning in May 2006. Royalties otherwise due on the net sales of products covered by the license agreement may be credited against the annual license maintenance fee obligations. As of December 31, 2018, we had paid approximately \$1.0 million to UConn under the license agreement. The license agreement gives us complete discretion over the commercialization of products covered by the licensed patent rights, but also requires us to use commercially reasonable diligent efforts to introduce commercial products within and outside the United States. If we fail to meet these diligence requirements, UConn may be able to terminate the license agreement.

In March 2003, we entered into an amendment agreement that amended certain provisions of the license agreement with UConn. The amendment agreement granted us a license to additional patent rights. In consideration for execution of the amendment

agreement, we agreed to pay UConn an upfront payment and to make future payments for licensed patents or patent applications. Through December 31, 2018, we have paid approximately \$100,000 to UConn under the license agreement, as amended.

On December 5, 2014, Agenus Switzerland, entered into a license agreement with the Ludwig Institute for Cancer Research Ltd., or Ludwig, which replaced and superseded a prior agreement entered into between the parties in May 2011. Pursuant to the terms of the license agreement, Ludwig granted Agenus Switzerland an exclusive, worldwide license under certain intellectual property rights of Ludwig and Memorial Sloan Kettering Cancer Center arising from the prior agreement to further develop and commercialize GITR, OX40 and TIM-3 antibodies. On January 25, 2016, we and Agenus Switzerland entered into a second license agreement with Ludwig, on substantially similar terms, to develop CTLA-4 and PD-1 antibodies. Pursuant to the December 2014 license agreement, Agenus Switzerland made an upfront payment of \$1.0 million to Ludwig. The December 2014 license agreement also obligates Agenus Switzerland to make potential milestone payments of up to \$20.0 million for events prior to regulatory approval of licensed GITR, OX40 and TIM-3 products, and potential milestone payments in excess of \$80.0 million if such licensed products are approved in multiple jurisdictions, in more than one indication, and certain sales milestones are achieved. Under the January 2016 license agreement, we are obligated to make potential milestone payments of up to \$12.0 million for events prior to regulatory approval of CTLA-4 and PD-1 licensed products, and potential milestone payments of up to \$32.0 million if certain sales milestones are achieved. Under each of these license agreements, we and/or Agenus Switzerland will also be obligated to pay low to mid-single digit royalties on all net sales of licensed products during the royalty period, and to pay Ludwig a percentage of any sublicensing income, ranging from a low to mid-double digit percentage depending on various factors. During the year ended December 31, 2017, we paid a percentage of sublicensing income totaling \$2.0 million to Ludwig under the license agreements. The license agreements may each be terminated as follows: (i) by either party if the other party commits a material, uncured breach; (ii) by either party if the other party initiates bankruptcy, liquidation or similar proceedings; or (iii) by Agenus Switzerland or us (as applicable) for convenience upon 90 days' prior written notice. The license agreements also contain customary representations and warranties, mutual indemnification, confidentiality and arbitration provisions.

In connection with the December 2015 acquisition of PhosImmune, we obtained exclusive rights to a portfolio of patent applications and one issued patent relating to phosphopeptide tumor targets (PTTs) under a patent license agreement with the University of Virginia ("UVA"). The UVA license gives us exclusive rights to develop and commercialize the PTT technology and an exclusive option to license any further PTT technology arising from ongoing research at UVA until December 2018. Under the license agreement, we will pay low to mid-single digit running royalties on net sales of PTT products, and a modest flat percentage of sublicensing income. In addition, we may be obligated to make milestone payments of up to \$2.7 million for each indication of a licensed PTT product to complete clinical trials and achieve certain sales thresholds. If we fail to meet certain diligence milestones, we may also be required to pay penalties in excess of \$150,000. The term of the UVA license agreement ends when the last of the licensed patents expires or becomes no longer valid. The term of the UVA license agreement ends when the last of the licensed patents expires or becomes no longer valid. The UVA license agreement may be terminated as follows: (i) by UVA in connection with our bankruptcy or cessation of business relating to the licensed technology, (ii) by UVA if we commit a material, uncured breach or (iii) by us for our convenience on 180 days written notice.

We have entered into various agreements with contract manufacturers, institutions, and clinical research organizations (collectively "third party providers") to perform pre-clinical activities and to conduct and monitor our clinical studies. Under these agreements, subject to the enrollment of patients and performance by the applicable third-party provider, we have estimated our total payments to be \$232.1 million over the term of the studies. For the years ended December 31, 2018, 2017, and 2016, \$41.5 million, \$35.8 million, and \$23.1 million, respectively, have been expensed in the accompanying consolidated statements of operations related to these third-party providers. Through December 31, 2018, we have expensed \$171.7 million as research and development expenses and \$173.8 million of this amount has been paid. The timing of expense recognition and future payments related to these agreements is subject to the enrollment of patients and performance by the applicable third-party provider.

(14) Revenue from Contracts with Customers

GSK License and Amended GSK Supply Agreements

In July 2006, we entered into a license agreement and a supply agreement with GSK for the use of QS-21 Stimulon (the “GSK License Agreement” and the “GSK Supply Agreement”, respectively). In January 2009, we entered into an Amended and Restated Manufacturing Technology Transfer and Supply Agreement (the “Amended GSK Supply Agreement”) under which GSK has the right to manufacture all of its requirements of commercial grade QS-21 Stimulon. GSK is obligated to supply us (or our affiliates, licensees, or customers) certain quantities of commercial grade QS-21 Stimulon for a stated period of time. Under these agreements, GSK paid an upfront license fee of \$3.0 million and agreed to pay aggregate milestones of \$5.0 million. In July 2007, the Amended GSK Supply Agreement was further amended, and we were paid an additional fixed fee of \$7.3 million. In March 2012 we entered into a First Right to Negotiate and Amendment Agreement amending the GSK License Agreement and the Amended GSK Supply Agreement to clarify and include additional rights for the use of our QS-21 Stimulon (the “GSK First Right to Negotiate Agreement”). In addition,

we granted GSK the first right to negotiate for the purchase of the Company or certain of our assets, which such rights expired in March 2017. As consideration for entering into the GSK First Right to Negotiate Agreement, GSK paid us an upfront, non-refundable payment of \$9.0 million, \$2.5 million of which is creditable toward future royalty payments. As of December 31, 2017, we had received all of the potential \$24.3 million in upfront and milestone payments related to the GSK Agreements. We were also generally entitled to receive 2% royalties on net sales of prophylactic vaccines for a period of 10 years after the first commercial sale of a resulting GSK product, but we sold these royalty rights to HCR in January 2018 pursuant to the HCR Royalty Purchase Agreement (See Note 18). The GSK License and Amended GSK Supply Agreements may be terminated by either party upon a material breach if the breach is not cured within the time specified in the respective agreement. The termination or expiration of the GSK License Agreement does not relieve either party from any obligation which accrued prior to the termination or expiration. Among other provisions, the license rights granted to GSK survive expiration of the GSK License Agreement. The license rights and payment obligations of GSK under the Amended GSK Supply Agreement survive termination or expiration, except that GSK's license rights and future royalty obligations do not survive if we terminate due to GSK's material breach unless we elect otherwise.

We assessed this arrangement in accordance with ASC 606 and concluded that the contract counterparty, GSK, is a customer. We identified the following performance obligations under the contract: (1) an exclusive license to QS-21 in the specified field and related technology transfer; and (2) an exclusive license to QS-21 in an additional field.

We determined that the fixed payments of \$19.3 million constituted all of the consideration to be included in the transaction price and to be allocated to the performance obligations based on their relative stand-alone selling prices. The fixed upfront consideration is recognized under ASC 606 based on when control of the combined performance obligation is transferred to the customer, which corresponds with the service period (through December 2014). At contract inception, the milestones of \$5.0 million had been excluded from the transaction price, as we could not conclude that it was probable a significant reversal would not occur. Event driven milestones are a form of variable consideration as the payments are variable based on the occurrence of future events. As part of its estimation of the amount, we considered numerous factors, including that receipt of the milestones is outside of our control and contingent upon success in future clinical trials and the licensee's efforts. Recognition of event driven milestones should be recognized when the variable consideration is able to be estimated. As of December 31, 2017, all milestones had been received, and therefore recognized.

Any consideration related to royalties will be recognized when the related sales occur as they were determined to relate predominantly to the license granted to GSK and therefore have also been excluded from the transaction price. We will re-evaluate the transaction price in each reporting period and as uncertain events are resolved or other changes in circumstances occur.

For the year ended December 31, 2018, we recognized \$17.3 million in non-cash royalty revenue from GSK. For the year ended December 31, 2017, we recognized \$1.0 million in research and development revenue related to the achievement of a milestone and for the year ended December 31, 2016, we did not recognize any revenue from GSK.

The cumulative impact of changing the timing of revenue recognition for the GSK License and Amended GSK Supply Agreements as of January 1, 2018 was a decrease to stockholders' deficit of approximately \$2.5 million and a corresponding decrease in deferred revenue of \$2.5 million for the portion of the upfront fee creditable toward future royalties, as described above. This amount was included in the transition adjustment, as under ASC 606 it would have been recognized as revenue in March 2012, at the time of the amendment.

Merck Collaboration and License Agreement

During the quarter ended June 30, 2014, we entered into a collaboration and license agreement with Merck to discover and optimize fully-human antibodies against two undisclosed cancer targets using the Retrocyte Display®. Under this agreement, Merck is responsible for the clinical development and commercialization of antibodies generated under the

collaboration. There are no unsatisfied performance obligations relating to this contract. Pursuant to the XOMA Royalty Purchase Agreement (see Note 18), we sold to XOMA 33% of the future royalties and 10% of the future milestones that we are entitled to receive from Merck, and we remain eligible to receive from Merck approximately \$85.5 million in potential payments associated with the completion of certain clinical, regulatory and commercial milestones, as well as 67% of all future royalties on worldwide product sales.

For each of the years ended December 31, 2018 and 2017, we recognized \$4.0 million in research and development revenue related to the achievement of milestones. For the year ended December 31, 2016, we recognized \$2.2 million in research and development revenue.

The adoption of ASC 606 did not have an impact on the Merck collaboration and license agreement.

Incyte Collaboration Agreement

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On January 9, 2015 and effective February 19, 2015, we entered into a global license, development and commercialization agreement (the “Collaboration Agreement”) with Incyte pursuant to which the parties plan to develop and commercialize novel immuno-therapeutics using our antibody discovery platforms. The Collaboration Agreement was initially focused on four checkpoint modulator programs directed at GITR, OX40, LAG-3 and TIM-3. In addition to the four identified antibody programs, the parties have an option to jointly nominate and pursue the development and commercialization of antibodies against additional targets during a five-year discovery period which, upon mutual agreement of the parties for no additional consideration, can be extended for an additional three years. In November 2015, we and Incyte jointly nominated and agreed to pursue the development and commercialization of three additional CPM targets. In February 2017, we amended the Collaboration Agreement by entering into a First Amendment to License, Development and Commercialization Agreement (the “Amendment”). See “Amendment” section below.

On January 9, 2015, we also entered into the Stock Purchase Agreement with Incyte Corporation whereby, for an aggregate purchase price of \$35.0 million, Incyte purchased approximately 7.76 million shares of our common stock.

Agreement Structure

Under the terms of the Collaboration Agreement, we received non-creditable, nonrefundable upfront payments totaling \$25.0 million. In addition, until the Amendment, the parties shared all costs and profits for the GITR, OX40 and two of the additional antibody programs on a 50:50 basis (profit-share products), and we were eligible to receive up to \$20.0 million in future contingent development milestones under these programs. Incyte is obligated to reimburse us for all development costs that we incur in connection with the TIM-3, LAG-3 and one of the additional antibody programs (royalty-bearing products) and we are eligible to receive (i) up to \$155.0 million in future contingent development, regulatory, and commercialization milestone payments and (ii) tiered royalties on global net sales at rates generally ranging from 6% to 12%. For each royalty-bearing product, we will also have the right to elect to co-fund 30% of development costs incurred following initiation of pivotal clinical trials in return for an increase in royalty rates. Additionally, we had the option to retain co-promotion participation rights in the United States on any profit-share product. Through the direction of a joint steering committee, until the Amendment, the parties anticipated that, for each program, we would serve as the lead for pre-clinical development activities through investigational new drug (“IND”) application filing, and Incyte would serve as the lead for clinical development activities. The parties initiated the first clinical trials of antibodies arising from these programs in 2016. For each additional program beyond GITR, OX40, TIM-3 and LAG-3 that the parties elect to bring into the collaboration, we will have the option to designate it as a profit-share product or a royalty-bearing product.

The Collaboration Agreement will continue as long as (i) any product is being developed or commercialized or (ii) the discovery period remains in effect. Incyte may terminate the Collaboration Agreement or any individual program for convenience upon 12 months’ notice. The Collaboration Agreement may also be terminated by either party upon the occurrence of an uncured material breach of the other party or by us if Incyte challenges patent rights controlled by us. In addition, either party may terminate the Collaboration Agreement as to any program if the other party is acquired and the acquiring party controls a competing program.

Amendment

Pursuant to the terms of the Amendment, the GITR and OX40 programs immediately converted from profit-share programs to royalty-bearing programs and we became eligible to receive a flat 15% royalty on global net sales should any candidates from either of these two programs be approved. Incyte is now responsible for global development and commercialization and all associated costs for these programs. In addition, the profit-share programs relating to TIGIT and one undisclosed target were removed from the collaboration, with the undisclosed target reverting to Incyte and TIGIT to Agenus. Should any of those programs be successfully developed by a party, the other party will be eligible to receive the same milestone payments as the royalty-bearing programs and royalties at a 15% rate on global net sales. The terms for the remaining three royalty-bearing programs targeting TIM-3, LAG-3 and one undisclosed target

remain unchanged, with Incyte being responsible for global development and commercialization and all associated costs. The Amendment gives Incyte exclusive rights and all decision-making authority for manufacturing, development, and commercialization with respect to all royalty-bearing programs.

In connection with the Amendment, Incyte paid us \$20.0 million in accelerated milestones related to the clinical development of the antibody candidates targeting GITR and OX40.

In February 2017, we also entered into a Stock Purchase Agreement with Incyte, pursuant to which Incyte purchased 10 million shares of our common stock at a purchase price of \$6.00 per share.

Pursuant to the XOMA Royalty Purchase Agreement, we sold to XOMA 33% of the future royalties and 10% of the future milestones that we were entitled to receive from Incyte, excluding the \$5.0 million milestone that we recognized in the three months ended September 30, 2018. As of December 31, 2018, we remain eligible to receive up to \$450.0 million in future potential

development, regulatory and commercial milestones across all programs in the collaboration, as well as 67% of all future royalties on worldwide product sales.

Collaboration Revenue

We identified the following performance obligations under the Incyte Collaboration Agreement, as amended: (1) combined license and related research and development (“R&D”) services to a GITR antibody, (2) combined license and related R&D services to an OX40 antibody, (3) combined license and related R&D services to a TIM-3 antibody, (4) combined license and related R&D services to a LAG-3 antibody, (5) combined license and related R&D services to a TIGIT antibody, (6) combined license and related R&D services to a first undisclosed target, (7) combined license and related R&D services to a second undisclosed target, and (8) the option to license certain other mutually agreed-upon antibodies combined with related R&D Services (“Assumed Project Options Development”). Each of these performance obligations consists of a license or option to a license and related R&D services through the filing of an IND for each antibody candidate.

We concluded that the licenses could be used with other readily available resources if the know-how was also transferred with the license; however, our knowledge and experience is necessary for further development of the licensed antibodies. Therefore, we determined that each of the licensed antibodies and the related developmental R&D services should be treated as a combined performance obligation. We also evaluated whether the Assumed Project Options Development was a material right. At contract inception Incyte paid us a nonrefundable access fee for the ability to exercise the option and bring additional targets into the program. Both we and Incyte have the ability to explore targets and, if mutually agreed upon, convert those targets into assumed projects for no additional license fee. We concluded that Assumed Project Options Development represents a material right and is therefore a performance obligation.

We determined that there were no significant financing components, noncash consideration, or amounts that may be refunded to the customer, and as such the total upfront fixed consideration of the \$10.0 million license fee and \$15.0 million project access fee would be included in the total transaction price of \$25.0 million. This amount was then allocated to the performance obligations on a relative stand-alone selling price basis.

The estimated variable consideration to be recognized for developmental R&D services and related reimbursable expenses (“Development Costs”) was determined based on the forecasted amounts in the research plan that had been approved by the both parties via the joint steering committee (“JSC”). Under the Agreement, Development Costs related to Profit-Sharing products are split equally between us and Incyte. Therefore, our expected revenue is 50% of the costs of these programs. Based on review of the budgets presented at the JSC meetings, as well as costs of previous R&D projects, we expected the total development costs over the term of the contract would be \$43.4 million. This amount was allocated entirely to the distinct R&D services that forms part of each performance obligation.

We determined that the transaction price of the Collaboration Agreement was \$78.6 million as of December 31, 2018, an increase of \$10.2 million from the transaction price of \$68.4 million as of December 31, 2017. In order to determine the transaction price, we evaluated all the payments to be received during the duration of the contract. We determined that the fixed upfront license fee and project access fee of \$10.0 million and \$15.0 million, respectively, and the \$53.6 million of actual and estimated variable consideration for development costs (including R&D services) and milestones constituted consideration to be included in the transaction price, which is allocated among the performance obligations.

For payments made to Incyte related to their work performed on profit-sharing programs, we considered that we will receive a benefit through the performance of a series of distinct R&D services by Incyte. Additionally, the R&D services are being provided by Incyte at fair value. Therefore, the amount paid to Incyte represents the fair value of the services performed, and no excess will be allocated as a reduction of the transaction price. We will record the consideration paid to Incyte in the same manner that we would purchases for other vendors, classified as R&D

expense.

In summary, each of the performance obligations includes a license or option to a license, and respective R&D services that will be performed over time from program initiation through the filing of an IND with respect to each antibody candidate. We have determined that the combined performance obligation is satisfied over time, and that the input method should be applied for all performance obligations that have consideration allocated to them. The cost-cost measure will be applied based on the percentage of completion of R&D services provided during the period compared to the respective budget. We believe this is the best measure of progress because other measures do not reflect how we transfer our performance obligation to Incyte. We will recognize the fixed consideration allocated to each performance obligation over time as the related R&D services are being performed using the input of R&D costs incurred over total R&D costs expected to be incurred through IND filing, beginning on the date a license is granted. A cost-based input method of revenue recognition requires management to make estimates of costs to complete our performance obligations. In making such estimates, significant judgment is required to evaluate assumptions related to cost estimates. The cumulative effect of revisions to estimated costs to complete our performance obligations will be recorded in the period in which

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changes are identified and amounts can be reasonably estimated. A significant change in these assumptions and estimates could have a material impact on the timing and amount of revenue recognized in future periods.

We considered the nature of the arrangement between Incyte and us in evaluating the classification of the payments to be received under the cost-sharing arrangement. We do not currently have any commercial products available for sale. Our primary operations to date have included research and development activities, licensing intellectual property and performing R&D services for external parties. Accordingly, arrangements such as this Collaboration Agreement represent our ongoing business operations. Therefore, we have concluded that payments received from Incyte under the cost-sharing arrangement represent payments made to us as part of our on-going operations and should be classified as revenue as such amounts are earned.

For the year ended December 31, 2018, we recognized approximately \$15.5 million of license and collaboration revenue. This amount included \$1.3 million of the transaction price for the Collaboration Agreement recognized based on proportional performance, \$10.0 million for the achievement of milestones and \$4.2 million for research and development services. For years ended December 31, 2017 and 2016, we recognized approximately \$37.3 million and \$19.7 million, respectively, of research and development revenue.

We expect to recognize deferred research and development revenue of \$0.9 million and \$1.2 million for 2019 and 2020, respectively, related to performance obligations that are unsatisfied or partially unsatisfied as of December 31, 2018. These amounts exclude amounts (milestones, R&D services and royalties) where we have a right to invoice the customer in the amount that corresponds directly with the value of the performance completed to date.

The cumulative impact of the adoption of ASC 606 for the Incyte Collaboration Agreement as of January 1, 2018 was a decrease to stockholders' deficit of approximately \$6.4 million and a corresponding decrease in deferred revenue of \$6.4 million.

Disaggregation of Revenue

The following table presents revenue (in thousands) for years ended December 31, 2018, 2017 and 2016, disaggregated by geographic region and revenue type. Revenue by geographic region is allocated based on the domicile of our respective business operations.

	Year ended December 31, 2018		
	United States	Europe	Total
Revenue Type			
Research and development services	\$4,150	\$—	\$4,150
License and collaboration milestones	10,000	4,000	14,000
Recognition of deferred revenue	1,325	—	1,325
Non-cash royalty revenue	17,309	—	17,309
	\$32,784	\$4,000	\$36,784
	Year ended December 31, 2017		
Revenue Type			
Research and development services	\$14,615	\$—	\$14,615
License and collaboration milestones	21,000	3,994	24,994
Recognition of deferred revenue	3,100	—	3,100

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Grant revenue	168	—	168
	\$38,883	\$3,994	\$42,877

Year ended December 31,
2016

Revenue Type			
Research and development services	\$16,631	\$234	\$16,865
License and collaboration milestones	—	2,000	2,000
Recognition of deferred revenue	3,522	—	3,522
Grant revenue	32	7	39
Service Revenue	147	—	147
	\$20,332	\$2,241	\$22,573

Contract Balances

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Contract assets primarily relate to our rights to consideration for work completed in relation to our R&D services performed but not billed at the reporting date. The contract assets are transferred to the receivables when the rights become unconditional. Currently, we do not have any contract assets which have not transferred to a receivable. We had no asset impairment charges related to contract assets in the period. The contract liabilities primarily relate to contracts where we received payments but have not yet satisfied the related performance obligations. The advance consideration received from customers for R&D services or licenses bundled with other promises is a contract liability until the underlying performance obligations are transferred to the customer.

The following table provides information about contract assets and contract liabilities from contracts with customers (in thousands):

Year ended December 31, 2018	Balance at beginning of period	Additions	Deductions	Balance at end of period
Contract assets:				
Unbilled receivables from collaboration partners	\$ -	\$ -	\$ -	\$ -
Contract liabilities:				
Deferred revenue	\$ 3,377	\$ -	\$ (1,325)	\$ 2,052

The change in contract liabilities is primarily related to the recognition of \$1.3 million of revenue in the year ended December 31, 2018. Deferred revenue related to our Collaboration Agreement with Incyte of \$2.0 million as of December 31, 2018, which was comprised of the \$25.0 million upfront payment, less \$23.0 million of license and collaboration revenue recognized from the effective date of the contract, will be recognized as the combined performance obligation is satisfied.

We also recorded a \$0.9 million receivable as of December 31, 2018 for R&D services provided.

In the year ended December 31, 2018, we did not recognize any revenue from amounts included in the contract asset or the contract liability balances from performance obligations satisfied in previous periods. None of the costs to obtain or fulfill a contract were capitalized.

(15) Related Party Transactions

Our Audit and Finance Committee approved a charitable contribution to the Children of Armenia Fund (“COAF”) totaling \$125,000 for 2018. Dr. Garo H. Armen, our CEO, is the founder and chairman of COAF. The 2018 charitable contribution was comprised of a cash component and a non-cash component. The cash component was \$75,000, which we paid in quarterly installments. The non-cash component was \$50,000, which was the estimated value of a portion of office space made available to COAF employees.

We also consider our transactions with Incyte, as disclosed in Note 14, to be related party transactions.

(16) Leases

We lease manufacturing, research and development, and office facilities under various lease arrangements. Rent expense (before sublease income) was \$2.4 million, \$2.6 million, and \$3.3 million, for the years ended December 31, 2018, 2017, and 2016, respectively.

We lease a facility in Lexington, Massachusetts for our manufacturing, research and development, and corporate offices, approximately 5,600 square feet of office space in New York, New York for use as corporate offices, a facility in Berkeley, California, for manufacturing and corporate offices and facilities in Charlottesville, Virginia and Cambridge, United Kingdom for research and development and corporate offices.

We previously leased facilities in Basel, Switzerland for manufacturing, research and development and corporate offices. During the year ended December 31, 2017 we terminated the lease for these facilities.

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The future minimum rental payments under our facility lease agreements, which expire at various times between 2020 and 2025, are as follows (in thousands):

Year ending December 31,	
2019	\$2,499
2020	2,279
2021	1,874
2022	1,915
2023	1,457
Thereafter	928
Total	\$10,952

In connection with the Lexington facility, we maintain a fully collateralized letter of credit of \$1.0 million. No amounts had been drawn on the letter of credit as of December 31, 2018. In addition, for our properties, we are required to have an aggregate deposit of approximately \$200,000 with the landlords as interest-bearing security deposits pursuant to our obligation under the leases.

We sublet a portion of our facilities and received rental payments of \$541,000, \$562,000, and \$733,000 for the years ended December 31, 2018, 2017, and 2016, respectively. We are contractually entitled to receive rental payments of \$561,000 and 578,000 in 2019 and 2020, respectively.

During 2016 and 2018, we entered into agreements which are classified as capital leases for a pieces of laboratory equipment. Both are included in our property and equipment as follows (in thousands):

	Estimated	Depreciable	2018	2017	Lives
Laboratory and manufacturing equipment	\$				