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

FORM 10-K

(Mark One)

☒ **ANNUAL REPORT PURSUANT TO SECTION 13 OR 15(d) OF THE SECURITIES EXCHANGE ACT OF 1934**
For the fiscal year ended December 31, 2021
OR

☐ **TRANSITION REPORT PURSUANT TO SECTION 13 OR 15(d) OF THE SECURITIES EXCHANGE ACT OF 1934**
FOR THE TRANSITION PERIOD FROM TO
Commission File Number 001-38582

Allakos Inc.

(Exact name of Registrant as specified in its Charter)

Delaware	**45-4798831**
(State or other jurisdiction of incorporation or organization)	**(I.R.S. Employer Identification No.)**
975 Island Drive, Suite 201 Redwood City, California	**94065**
(Address of principal executive offices)	**(Zip Code)**

Registrant's telephone number, including area code: (650) 597-5002

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

Title of Each Class	Trading Symbol(s)	Name of Each Exchange on Which Registered
Common Stock, par value $0.001	ALLK	The Nasdaq Global Select Market

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

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

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

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

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

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

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

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

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

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

The aggregate market value of the common stock held by non-affiliates of the Registrant based on the closing price of the Registrant's Common Stock on the Nasdaq Global Select Market as of June 30, 2021 was $3,236.6 million.

The number of shares of Registrant's Common Stock outstanding as of February 23, 2022 was 54,691,012.

Portions of the Registrant's Definitive Proxy Statement relating to the registrant's 2022 Annual Meeting of Shareholders are incorporated by reference into Part III of this Annual Report on Form 10-K where indicated. Such Definitive Proxy Statement will be filed with the Securities and Exchange Commission within 120 days after the end of the registrant's 2021 fiscal year ended December 31, 2021.

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PART I

Item 1. Business.

Overview

We are a clinical stage biotechnology company developing therapeutics which target immunomodulatory receptors present on immune effector cells involved in allergy, inflammatory and proliferative diseases. Activating these immunomodulatory receptors allows us to directly target cells involved in disease pathogenesis and, in the setting of allergy and inflammation, has the potential to result in broad inhibition of inflammatory cells. In the setting of proliferative diseases, blocking the inhibitory function of the receptors could restore the immune cell's ability to identify and kill proliferative cells. Our most advanced antibodies are lirentelimab (AK002) and AK006. Lirentelimab selectively targets both mast cells and eosinophils, two types of white blood cells that are widely distributed in the body and play a central role in the inflammatory response. Inappropriately activated mast cells and eosinophils have been identified as key drivers in a number of severe diseases affecting the gastrointestinal tract, eyes, skin, lungs and other organs. We are developing lirentelimab for the treatment of eosinophilic esophagitis ("EoE"), eosinophilic gastritis ("EG"), eosinophilic duodenitis ("EoD"), atopic dermatitis, chronic spontaneous urticaria and potentially additional indications. Lirentelimab has received orphan disease status for EG, EoD, and EoE from the U.S. Food and Drug Administration (the "FDA").

AK006 targets Siglec-6, an inhibitory receptor expressed selectively on mast cells. AK006 appears to have the potential to provide deeper mast cell inhibition than lirentelimab and, in addition to its inhibitory activity, reduce mast cell numbers. We plan to begin human studies with AK006 in the first half of 2023.

To date, lirentelimab has completed a Phase 2 study (ENIGMA 1) and Phase 3 study (ENIGMA 2) in patients with EG and/or EoD, a Phase 2/3 study in patients with EoE (KRYPTOS), as well as proof of concept studies in chronic spontaneous urticaria, severe allergic conjunctivitis, and indolent systemic mastocytosis.

The Phase 2 EG and/or EoD study with lirentelimab (ENIGMA 1) met all prespecified primary and secondary endpoints when compared to placebo and results were published in The New England Journal of Medicine. More recently, the ENIGMA 2 study met the histologic co-primary endpoint but failed to meet the symptomatic co-primary endpoint when compared to placebo. Similarly, the KRYPTOS study met the histologic co-primary endpoint but failed to meet the symptomatic co-primary endpoint when compared to placebo. After conducting post-hoc analyses, we believe that the trials missed their symptomatic co-primary endpoints due to the inclusion of mild patients and/or patients who had not failed standard of care. Although post-hoc analyses cannot be used to establish efficacy, these analyses can be helpful in generating hypothesis for future clinical studies. Based on these analyses, we believe that lirentelimab may have potential to treat the more severe EG/EoD and EoE patient populations. As a result, we plan to conduct additional studies with lirentelimab in these indications after discussions with the FDA.

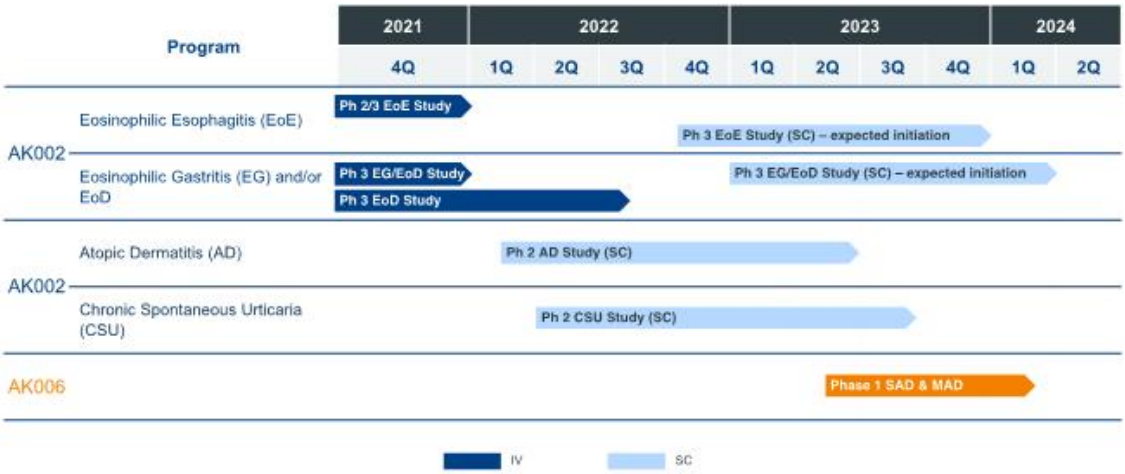
EoE is a severe orphan gastrointestinal disease characterized by dysphagia (difficulty swallowing) resulting from inflammation caused by elevated and inappropriately activated mast cells and eosinophils. The estimated prevalence of EoE in the United States is approximately 150,000-200,000 patients and there are no treatments currently approved specifically for this disease.

EG and/or EoD are chronic, often severe, inflammatory diseases characterized by persistent gastrointestinal symptoms and elevated and activated eosinophils in the stomach and/or duodenum, respectively. Emerging data suggests that activated mast cells also contribute to disease pathogenesis. Common symptoms of the diseases include abdominal pain, nausea, bloating, cramping, early satiety and loss of appetite. There are no treatments approved specifically for these diseases. Treatment with systemic steroids can provide symptomatic improvement, but long-term treatment with steroids is generally not possible due to the numerous side effects. Published literature reports the prevalence of EG and EoD in the United States to be approximately 50,000 people. However, we believe that these diseases may be significantly underdiagnosed or misdiagnosed as other gastrointestinal diseases.

Beyond EoE, EG and EoD, additional lirentelimab clinical testing is ongoing or planned. Allakos initiated a randomized, double-blind, placebo-controlled Phase 2 clinical trial of subcutaneous (SC) lirentelimab in adult patients with moderate-to-severe atopic dermatitis. The company also announced plans to initiate a randomized, double-blind, placebo-controlled trials of SC lirentelimab in patients with chronic spontaneous urticaria in the middle of 2022. Both diseases are complex, chronic inflammatory skin diseases believed to be driven by activated eosinophils and mast cells.

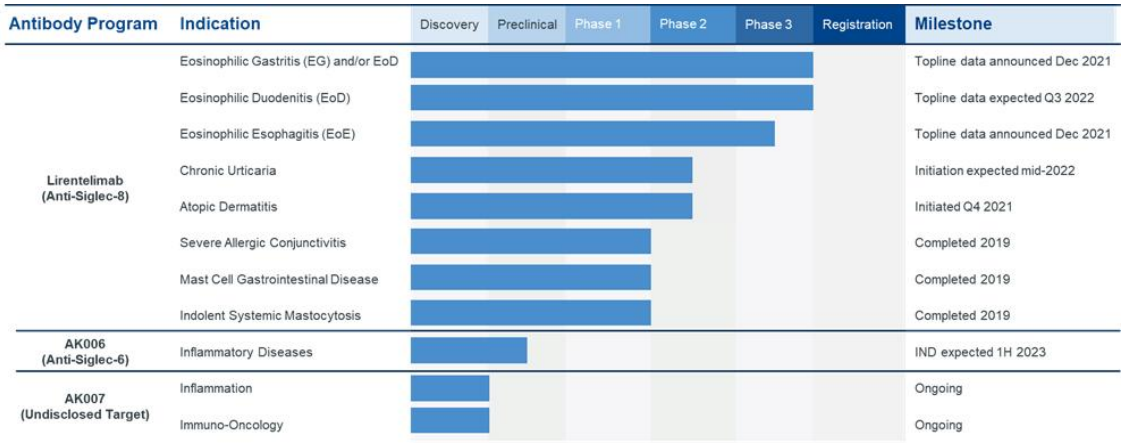
Atopic dermatitis is a chronic pruritic inflammatory condition that is characterized by dry, red, itchy patches of skin. Atopic dermatitis affects approximately 16.5 million (7.3%) adults in the U.S., of which around 6.6 million (40%) have moderate-to-severe disease. Chronic urticaria is an often-debilitating skin condition characterized by frequent and unpredictable eruption of hives, severe itching and swelling. Chronic urticaria affects up to 3.5 million patients in the U.S., of which half are refractory to standard-of-care antihistamines.

Figure 1: Expected Development Timeline



Lirentelimab has shown activity in open label clinical studies in indolent systemic mastocytosis ("ISM", see Indolent Systemic Mastocytosis for clinical results), severe allergic conjunctivitis ("SAC", see severe allergic conjunctivitis for clinical results), and mast cell gastrointestinal disease ("MGID", see mast cell gastritis clinical results). In addition, patients in clinical studies with atopic comorbidities such as asthma, atopic dermatitis, and allergic rhinitis experienced improvements in these conditions. The activity observed in these studies suggests that lirentelimab could provide significant benefit to patients suffering from these diseases and highlights the potential of lirentelimab to broadly inhibit mast cells and deplete eosinophils in different disease settings.

Figure 2: Allakos Pipeline



To date, lirentelimab has been administered intravenously in our completed clinical efficacy studies. Lirentelimab has generally been well-tolerated in each of our clinical trials. The most common adverse event with

intravenous lirentelimab has been the occurrence of mild to moderate infusion related reactions, consisting of flushing, feeling of warmth, headache, nausea or dizziness, which occurred mostly during the first infusion and diminished or did not occur on subsequent infusions.

We have also developed a formulation of lirentelimab for subcutaneous ("SC") administration which will be used in all current and future studies. SC lirentelimab has completed a Phase 1 study in healthy volunteers evaluating the safety, tolerability and pharmacokinetics of SC lirentelimab (for additional information, see "Lirentelimab Clinical Development–Subcutaneous Lirentelimab"). SC lirentelimab provided prolonged eosinophil depletion and was well tolerated; there were no serious adverse events, no injection site reactions, and no injection-related reactions.

Understanding the Foundation of Our Approach

Background on Mast Cells, Eosinophils, Siglec-8 and Siglec-6

Mast cells and eosinophils are involved in many inflammatory conditions and therefore represent attractive drug targets. Mast cells and eosinophils can respond to signals from allergens, tissues, bacteria, viruses and also cells of the innate and adaptive immune system. In response, they release a large variety of mediators which can result in tissue damage, fibrosis and the recruitment and activation of other innate and adaptive immune cells. The ability to respond to signals from multiple cell types and the diverse array of mediators that they produce place mast cells and eosinophils in the center of multiple aspects of the inflammatory response.

Eosinophils are normally present in the blood and tissues, especially in the mucosal linings of the respiratory and lower gastrointestinal tract. However, they can be recruited to any site of the body in the setting of inflammation. Mast cells reside within tissues and all vascularized organs, often located in close proximity to blood vessels, nerves and lymphatics. Sites include the dermis, gut mucosa and submucosa, conjunctiva and pulmonary alveoli and airways. As a result of their widespread location and potent inflammatory activity, mast cells and eosinophils have been identified as key drivers in a number of severe diseases of the gastrointestinal tract, eyes, skin and lungs as well as diseases which affect multiple organ systems.

Siglec-8 is an inhibitory receptor selectively expressed on eosinophils and mast cells. Because Siglec-8 is expressed in high abundance only on mast cells and eosinophils, it presents a novel way to selectively target these important immune cells. Siglec-6 is an inhibitory receptor that our research shows is selectively expressed on mast cells. As inhibitory receptors, the natural function of Siglec-8 and Siglec-6 is to counteract activating signals within mast cells and eosinophils that lead to an inflammatory response.

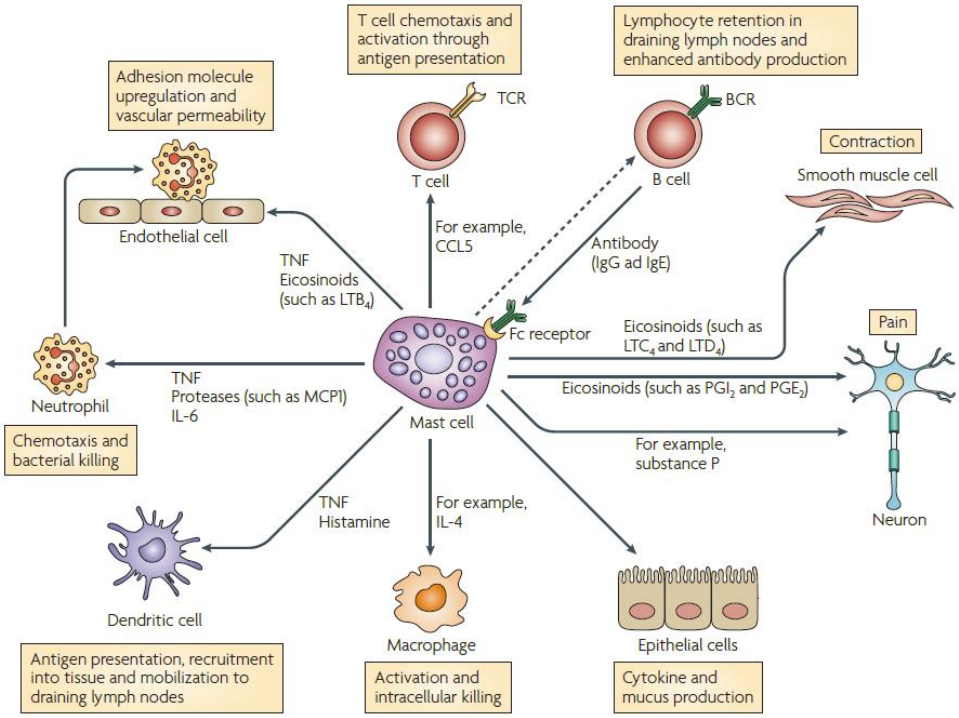
Mast cells and Eosinophils are Effector Cells That are Central to Initiating and Maintaining Inflammatory Responses

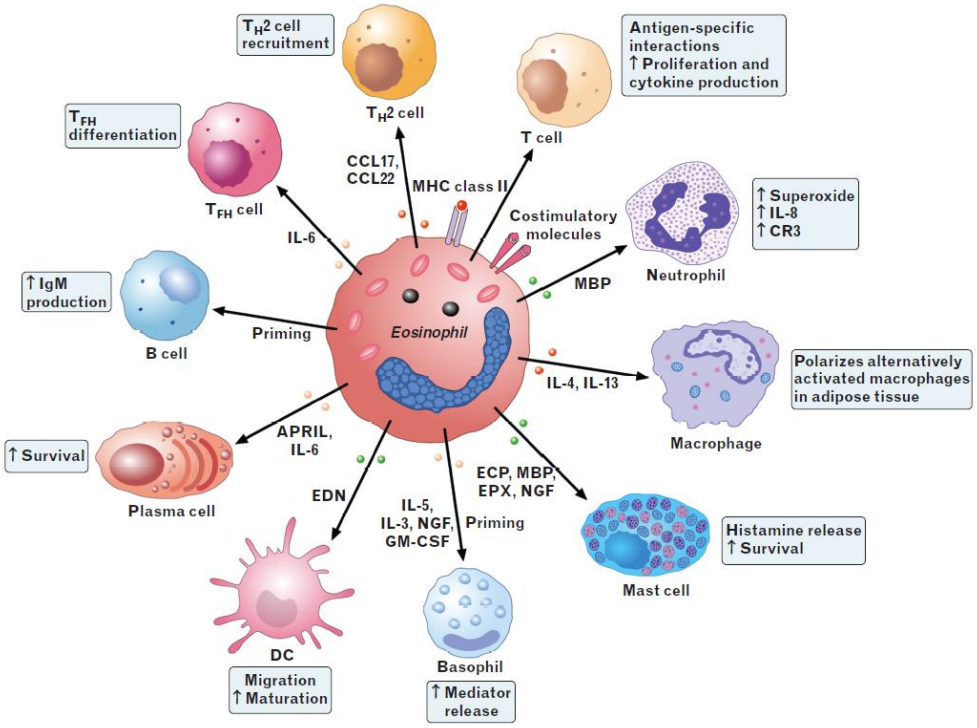
Mast cells and/or eosinophils respond to a variety of activating signals including those from cell-cell contact, allergens bound to IgE, neuropeptides (such as Substance P), cytokines including IL-33, thymic stromal lymphopoietin ("TSLP"), IL-5, IL-4 and IL-13 and viruses through Toll-Like Receptors. In response to these and other activating signals, mast cells and eosinophils produce a broad range of inflammatory mediators that cause tissue damage and contribute to acute and chronic inflammation. These mediators include vasoactive amines, bioactive lipids, proteases, chemokines and cytokines. The mediators, their functions and their contribution to disease pathogenesis are described in more detail below.

- *Mast cells play an important role in inflammation as the main producer of histamine*. Histamine causes vasodilation and produces intense itching. It is believed to contribute to increased gastrointestinal peristalsis (diarrhea), the skin symptoms of urticaria and ISM, the diffuse vasodilation of anaphylaxis and bronchospasm in asthma.
- *Proteases secreted from mast cells and eosinophils are the key cause of tissue damage and contribute to tissue fibrosis.* Eosinophil and mast cell secretions are toxic to surrounding cells and break down tissues, resulting in fibrosis and tissue remodeling.
- *Mast cells and eosinophils drive inflammation by signaling to other cells of the immune system.* Mast cells and eosinophils release lipid mediators and a large variety of cytokines including TNFa, IL-1, IL-3, IL-4, IL-5, IL-6, IL-8, IL-9, IL-13, MCP-1, CCL2, CCL3, CCL5, CCL17, TGFa, TGFb and

granulocyte-macrophage colony stimulating factor, that attract and activate cells of the innate and adaptive immune system, such as neutrophils, monocytes, macrophages, basophils, B-cells, T-cells and dendritic cells, as well as other mast cells and eosinophils.

Figure 3. Mast Cell and Eosinophil Functions



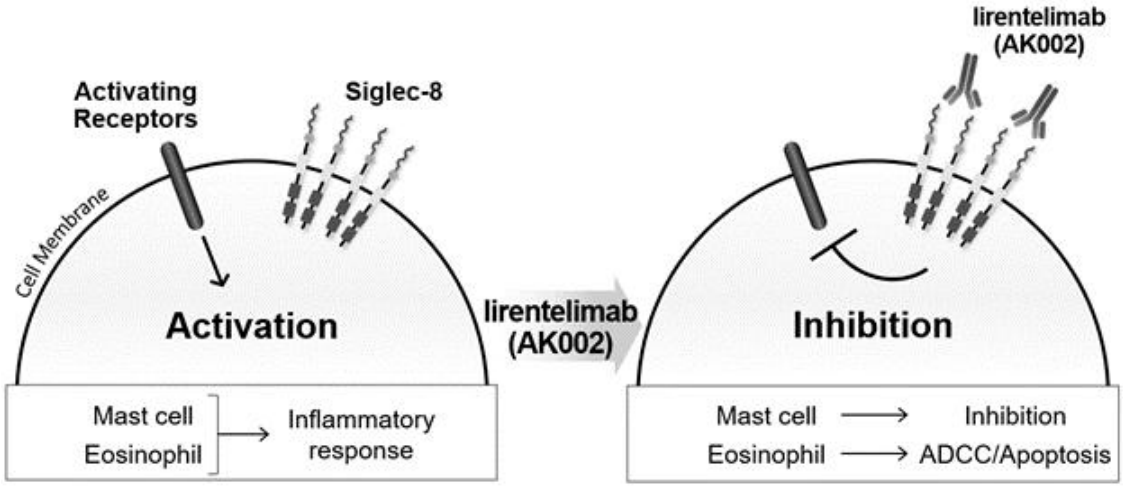


Due to their ability to respond to signals from multiple cell types and elicit responses from others, mast cells and eosinophils mediate the immediate hypersensitivity and late phase responses responsible for allergies and many innate and adaptive immune responses.

Siglec-8 is an Attractive Target for Mast Cell and Eosinophil Driven Diseases

Siglec-8 (sialic acid immunoglobulin-like lectin 8) is a constitutively expressed inhibitory receptor that is restricted to eosinophils, mast cells and to a lesser extent, basophils (approximately 1/100 the level on mast cells and eosinophils). The physiological function of Siglec-8 is to provide an inhibitory signal to mast cells and eosinophils. Siglec-8 exerts these effects through an intracellular immunoreceptor tyrosine-based inhibitory motif ("ITIM") and ITIM-like motif. In contrast to approaches which block a single activating cytokine or receptor, targeting the ITIM signaling cascade (via Siglec-8) has the potential to counteract a broad array of activating signals, which could allow for the treatment of multiple diseases. Antibodies to Siglec-8 have been shown to trigger antibody-dependent cellular cytotoxicity ("ADCC") of blood eosinophils and apoptosis of tissue eosinophils and to inhibit the release of inflammatory mediators from mast cells.

Figure 4. Siglec-8 Triggers Apoptosis of Eosinophils and Inhibition of Mast Cells



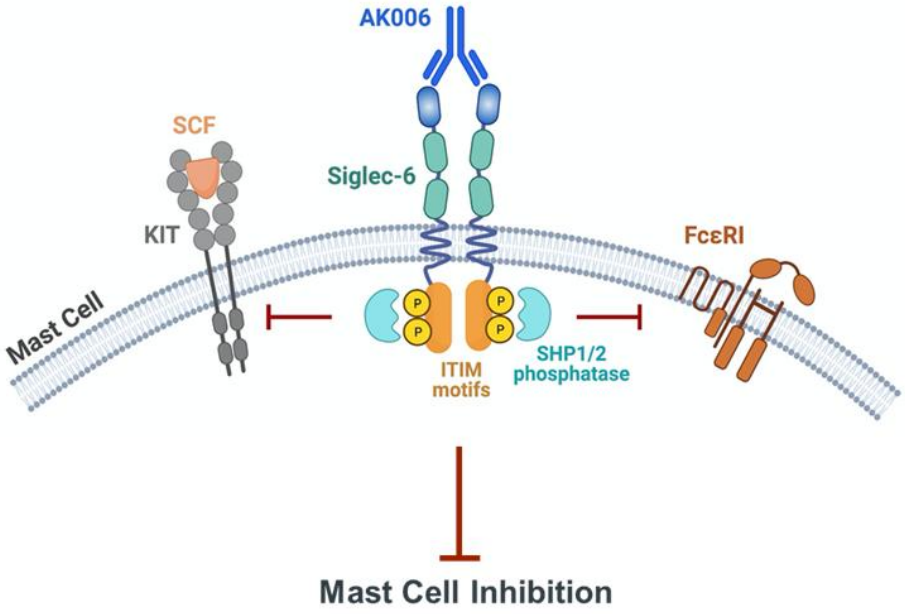
Lirentelimab (AK002) Binds to Siglec-8

Lirentelimab was designed to take advantage of the selective expression pattern and inhibitory function of Siglec-8, an inhibitory receptor found on eosinophils and mast cells. Lirentelimab is a humanized antibody that binds to Siglec-8 with high affinity (bivalent binding avidity KD = 17 pM, determined by surface plasmon resonance analysis). Binding of lirentelimab to Siglec-8 on mast cells and eosinophils triggers apoptosis of eosinophils and inhibition of mast cells. Lirentelimab is a non-fucosylated IgG1 antibody engineered to have potent ADCC. ADCC is a mechanism whereby the binding of an antibody like lirentelimab to a target cell in the blood, such as an eosinophil, triggers a natural killer ("NK") cell, to bind to the Fc portion of the antibody bound to the target cell, thereby destroying the antibody-bound cell. This provides lirentelimab with an additional mechanism to deplete eosinophils present in blood. As a result of these dual modes of action, lirentelimab has been shown to deplete eosinophils in blood and tissue, and to inhibit the release of inflammatory mediators from mast cells.

Siglec-6 is an Attractive Target for Mast Cell Driven Diseases

Siglec-6 (sialic acid immunoglobulin-like lectin 6) is a constitutively expressed inhibitory receptor that is selectively expressed on mast cells. The physiological function of Siglec-6 is to provide an inhibitory signal to mast cells. Siglec-6 exerts these effects through an intracellular immunoreceptor tyrosine-based inhibitory motif ("ITIM") and ITIM-like motif. In preclinical studies, AK006, our humanized antibody to Siglec-6 reduces mast cell numbers and has been shown to have broader and deeper inhibition of mast cell activity than lirentelimab, including the ability to inhibit c-KIT activation. The increased inhibitory activity could give AK006 increased therapeutic activity while avoiding toxicities associated with less selective mast cell targeting drugs.

Figure 5. AK006 Triggers Potent Inhibition of Mast Cells



Our Strategy

Lirentelimab has shown activity in human clinical studies as well as activity in a broad array of animal disease models of mast cell and eosinophil driven diseases. We have prioritized our lirentelimab development efforts based on our assessment of the probability of clinical and regulatory success, unmet medical need and potential market opportunity. We have assembled a team with a proven track record and deep experience in antibody discovery and in clinical development, operations and finance.

The key elements of our strategy are to:

- ***Advance lirentelimab through clinical development in Eosinophilic Gastrointestinal Diseases ("EGIDs").*** Lirentelimab has secured orphan drug designation for the treatment of EoE, EG and EoD from the FDA. Despite positive results from the Phase 2 EG and/or EoD study with lirentelimab (ENIGMA 1), the ENIGMA 2 failed to meet the symptomatic co-primary endpoint when compared to placebo. Similarly, the KRYPTOS study met the histologic co-primary endpoint but failed to meet the symptomatic co-primary endpoint when compared to placebo. After conducting post-hoc analyses, we believe that the trials missed their symptomatic co-primary endpoints due to the inclusion of mild patients and/or patients who had not failed standard of care. Based on these analyses, we believe that lirentelimab may have potential to treat the more severe EG/EoD and EoE patient populations. As a result, we plan to conduct additional studies with SC lirentelimab in these indications after discussions with the FDA.
- ***Evaluate additional eosinophilic and mast cell driven conditions.*** We have an ongoing Phase 2 trial in patients with AD and a planned Phase 2b trial in patients with CSU. These diseases are believed to be driven by activated eosinophils and mast cells. We have also completed trials in patients with MGID, CU, ISM, and SAC and will continue to evaluate potential commercial opportunities in these, as well as other indications.
- ***Build therapeutic pipeline.*** Our research is focused on immunomodulatory receptors present on immune effector cells involved in allergy, inflammatory and proliferative diseases. Activating these immunomodulatory receptors allows us to directly target cells involved in disease pathogenesis and, in

the setting of allergy and inflammation, has the potential to result in broad inhibition of inflammatory cells. In the setting of proliferative diseases, blocking the inhibitory the function of the receptors could restore the immune cell's ability to identify and kill proliferative cells. Following this approach, we have developed lirentelimab and AK006 and have research programs directed at other immunomodulatory targets.

Lirentelimab Clinical Development

To date, lirentelimab has completed a Phase 2 study (ENIGMA 1) and Phase 3 study (ENIGMA 2) in patients with EG and/or EoD, a Phase 2/3 study in patients with EoE (KRYPTOS), as well as proof of concept studies in chronic spontaneous urticaria, severe allergic conjunctivitis, and indolent systemic mastocytosis. In addition, phase 2 clinical studies are being conducted or planned in atopic dermatitis and chronic spontaneous urticaria.

The Phase 2 EG and/or EoD study with lirentelimab (ENIGMA 1) met all prespecified primary and secondary endpoints when compared to placebo and results were published in The New England Journal of Medicine. More recently, the ENIGMA 2 study met the histologic co-primary endpoint but failed to meet the symptomatic co-primary endpoint when compared to placebo. Similarly, the KRYPTOS study met the histologic co-primary endpoint but failed to meet the symptomatic co-primary endpoint when compared to placebo. After conducting post-hoc analyses, we believe that the trials missed their symptomatic co-primary endpoints due to the inclusion of mild patients and/or patients who had not failed standard of care. Although post-hoc analyses cannot be used to establish efficacy, these analyses can be helpful in generating hypothesis for future clinical studies. Based on these analyses, we believe that lirentelimab may have potential to treat the more severe EG/EoD and EoE patient populations. As a result, we plan to conduct additional studies with SC lirentelimab in these indications after discussions with the FDA.

Subcutaneous Lirentelimab

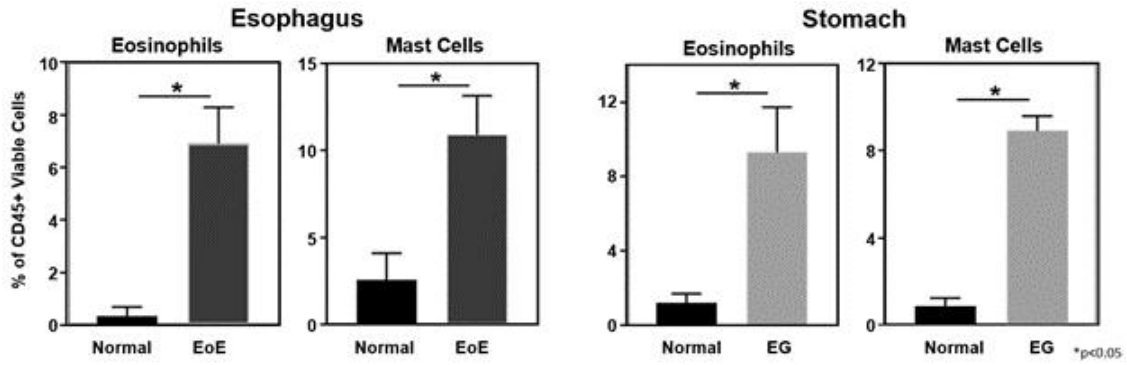
To date, lirentelimab has been administered intravenously in our completed clinical efficacy studies. We have developed a formulation of lirentelimab for SC administration which will be used in all current and future studies. SC Lirentelimab completed a randomized, double-blind, placebo-controlled, single dose, dose ranging Phase 1 study in healthy volunteers evaluating the safety, tolerability and pharmacokinetics of SC lirentelimab. Administration of SC lirentelimab resulted in extended eosinophil suppression at all dose levels tested. At dose levels of 3.0 and 5.0 mg/kg and with the fixed dose of 300 mg, SC lirentelimab resulted in eosinophil suppression in all subjects through Day 85. The pharmacokinetic and pharmacodynamic results suggest that SC lirentelimab may be given monthly or potentially less frequently. SC lirentelimab was well tolerated, and there were no serious adverse events, no injection site reactions, and no injection-related reactions with SC lirentelimab.

Eosinophilic Gastrointestinal Diseases ("EGIDs")

EGIDs are a collection of chronic inflammatory disorders that share a similar eosinophilic driven inflammation that occurs along different segments of the gastrointestinal ("GI") tract. Based on the site of eosinophilic infiltration, EGIDs are categorized into EoE (esophagus), EG (stomach), EoD (duodenum), and eosinophilic colitis (colon). There are no treatments currently approved specifically for these diseases and lirentelimab has secured orphan drug designation for EG, EoD, and EoE from the FDA.

It is believed that EGIDs arise in some patients from food allergies or other allergens that cause a hypersensitivity reaction that leads to recruitment of eosinophils to the GI tract. Mast cells are also elevated and activated and are believed to play a significant role. The gastrointestinal symptoms are believed to be due to the release of inflammatory mediators from activated eosinophils and mast cells. Elevated serum immunoglobulin E ("IgE") levels and food-specific IgE are correlated with EG in some patients and provide evidence for the allergy hypothesis and mast cell involvement. We have demonstrated that in biopsies of patients with symptomatic EG, mast cells are present in elevated numbers compared to normal controls and that the mast cells are also in an increased activation state, providing additional evidence for a pathogenic role of mast cells in EGIDs.

Figure 6. Mast Cells and Eosinophils are Elevated in EGIDs



Because lirentelimab has the potential to directly deplete eosinophils and broadly inhibits mast cells, we believe it has the potential to overcome limitations of other agents acting only on one cell type or pathway.

Eosinophilic Esophagitis

EoE is an orphan disease characterized by eosinophil and mast cell driven inflammation of the esophagus. Common symptoms of EoE include dysphagia (difficulty swallowing), food impaction, nausea and vomiting. Diagnosis is established based on clinical presentation (dysphagia) combined with increased tissue eosinophils in biopsy specimens from the esophagus without any other cause for the eosinophilia. The presence of greater than 15 eosinophils per HPF in an esophageal biopsy identifies the presence of EoE. The estimated prevalence of EoE in the United States is approximately 150,000-200,000 patients.

Eosinophilic Gastritis and Eosinophilic Duodenitis

EG and EoD are diseases characterized by chronic inflammation due to infiltration of eosinophils and mast cells into layers of the stomach and duodenum. Symptoms commonly include abdominal pain, nausea, early satiety, loss of appetite, abdominal cramping, bloating, malnutrition and weight loss. EG and EoD can occur with eosinophilia isolated to the stomach or duodenum, or often in combination. Diagnosis is established based on clinical presentation (gastrointestinal symptoms) combined with increased tissue eosinophils in biopsy specimens from the stomach and/or duodenum without any other cause for the eosinophilia. The presence of greater than or equal to 30 eosinophils per high-powered field (“HPF”) in 5 HPFs in the stomach indicates the presence of EG, and the presence of greater than or equal to 30 eosinophils per HPF in 3 HPFs in the duodenum indicates the presence of EoD. Based on ICD-9 codes, the prevalence of EG and EoD in the United States has previously been reported in the literature to be approximately 50,000 patients. However, we believe these diseases may be significantly under-diagnosed, or mis-diagnosed as other gastrointestinal diseases (such as irritable bowel syndrome or functional dyspepsia), based on observations from the ENIGMA study, ENIGMA 2 study as well as results of a prevalence study we conducted to assess the prevalence of EG and EoD in patients with chronic gastrointestinal symptoms.

Current Therapies and Limitations

There are no FDA-approved treatments for EG, EoD or EoE. Current therapies and disease management strategies include restricted/elemental diets and systemic or topical corticosteroids. Restricted/elemental diets are designed to avoid foods which trigger symptoms. Unfortunately for most patients the restricted/elemental diets are only partially effective and mainly used as a strategy to provide nutrition despite continuing symptoms. Corticosteroids, systemic or topical, can provide symptom relief, but are not appropriate for long-term treatment due to their numerous side effects.

ENIGMA Study: Phase 2 Study in Patients with EG and/or EoD

Study Design

The ENIGMA study, a randomized, double-blind, placebo-controlled Phase 2 study of lirentelimab enrolled patients with active, biopsy-confirmed EG and/or EoD. Patients were required to be moderately to severely symptomatic based on a patient reported symptom questionnaire and to subsequently have biopsy confirmed eosinophilia of the stomach (≥ 30 eosinophils/HPF in 5 HPFs) and/or duodenum (≥ 30 eosinophils/HPF in 3 HPFs). Qualifying patients were randomized 1:1:1 to receive: (a) 0.3 mg/kg of lirentelimab for the first month followed by three doses of 1.0 mg/kg given monthly, (b) 0.3 mg/kg of lirentelimab for the first month followed by 1.0 mg/kg, 3.0 mg/kg and 3.0 mg/kg given monthly, or (c) a monthly placebo. Disease symptoms were measured daily using a patient reported symptom questionnaire that scored 8 symptoms on a scale from 0 to 10 (abdominal pain, nausea, vomiting, early satiety, loss of appetite, abdominal cramping, bloating, and diarrhea). Endpoints were assessed per protocol in a prespecified hierarchical order using biopsies collected at the end of study and symptom questionnaires collected over the last two weeks of study prior to biopsy. The primary endpoint was the percent change from baseline in the number of tissue eosinophils obtained from gastric or duodenal biopsies. The secondary endpoints were (1) proportion of patients with a greater than 75% reduction in tissue eosinophil counts from biopsies and a greater than 30% reduction in Total Symptom Score ("TSS") from the patient reported questionnaire and (2) the percent change from baseline in the TSS.

Study Results

Lirentelimab showed a statistically significant benefit when compared to placebo on all primary and secondary endpoints for each of the high dose, low dose, and combined high/low dose lirentelimab groups. The data demonstrate that lirentelimab produced histological resolution of gastrointestinal tissue eosinophilia and improved disease symptoms, and that these benefits occurred in the same individuals. Results from this study were published in The New England Journal of Medicine.

Figure 7: Topline results from the ENIGMA study

Primary and Secondary Endpoints	Placebo (n=20)	High Dose lirentelimab (n=20)	Low Dose lirentelimab (n=19)	Combined lirentelimab (n=39)
1° Endpoint: change in gastric or duodenal eosinophil counts	+10%	-97%	-92%	-95%
p–value	—	<0.0001	<0.0001	<0.0001
2° Endpoint: treatment responders [1]	5%	70%	68%	69%
p–value	—	0.0009	0.0019	0.0008
2° Endpoint: change in TSS [2]	-24%	-58%	-49%	-53%
p–value	—	0.0012	0.0150	0.0012

[1] Treatment responders defined as patients with greater than a 75% reduction in biopsy eosinophil counts and a greater than 30% reduction in TSS.

[2] TSS is the sum of all 8 patient reported symptoms each measured on a scale from 0 to 10 (abdominal pain, nausea, vomiting, early satiety, loss of appetite, abdominal cramping, bloating, and diarrhea).

Safety

Lirentelimab was generally well tolerated. The only treatment emergent adverse event occurring more frequently on lirentelimab than on placebo was mild to moderate IRRs, such as flushing, feeling of warmth, headache, nausea, and/or dizziness, which occurred in 60% of patients receiving lirentelimab versus 23% of patients receiving placebo. There was 1 drug-related serious adverse event ("SAE") in the study, consisting of an infusion-related reaction ("IRR") that resolved within 24 hours. Treatment emergent SAEs occurred in 9% of patients receiving lirentelimab versus 14% of patients receiving placebo.

Results in Patients with EoE

Esophageal eosinophil counts and dysphagia improved in patients with comorbid eosinophilic esophagitis.

Figure 8: EoE endpoints from the ENIGMA study

Exploratory Endpoints	Placebo	Combined lirentelimab
EoE: proportion of patients with esophageal eosinophil counts <6/HPF	1/9 (11%)	13/14 (93%)
EoE: change in patient reported dysphagia questionnaire	-17%	-53%

Steroid Use

All allowed baseline medications remained constant throughout the baseline period and study. Acute steroids could be used at the physician's discretion to prevent or treat IRRs. Acute steroid use was balanced between lirentelimab and placebo groups with 28% and 35% of patients in the lirentelimab and placebo group receiving acute steroids, respectively. Statistically significant results were also observed on all primary and secondary endpoints in the subgroup of patients who did not receive acute steroids.

ENIGMA 2: Phase 3 Study in Patients with EG and/or EoD

Study Design

The ENIGMA 2 study, a randomized, double-blind, placebo-controlled Phase 3 trial of intravenous lirentelimab enrolled 180 patients with EG and/or EoD. Patients were required to be moderately to severely symptomatic based on a patient reported symptom questionnaire and have biopsy-confirmed eosinophilia of the stomach (≥30 eosinophils/HPF in 5 HPFs) and/or duodenum (≥30 eosinophils/HPF in 3 HPFs). Patients were randomized 1:1 to receive: 1.0 mg/kg of lirentelimab for the first month followed by five doses of 3.0 mg/kg given monthly or (b) a monthly placebo. Disease symptoms were measured daily using a patient reported symptom questionnaire that scored 6 symptoms (abdominal pain, nausea, bloating, early satiety, abdominal cramping, loss of appetite) each on a scale from 0 to 10 (TSS). Co-primary endpoints were (1) proportion of responders with ≤4 eosinophils/hpf in 5 HPFs in the stomach and/or ≤15 eosinophils/HPF in 3 HPFs in the duodenum at the end of week 24 and (2) absolute change from baseline in TSS at weeks 23-24.

Study Results

Lirentelimab showed a statistically significant benefit when compared to placebo on the histology co-primary endpoint but failed to meet the symptomatic co-primary endpoint when compared to placebo.

Figure 9: Topline results from the ENIGMA 2 study

Co-Primary Endpoints	Placebo (n=91)	Lirentelimab (n=89)
Histology Endpoint: Proportion of responders as determined by gastric or duodenal tissue eosinophil count[1]	4.5%	84.6%
p-value	—	<0.0001
	Baseline TSS: 27.7	Baseline TSS: 29.5
Symptom Endpoint: Absolute mean change in patient reported Total Symptom Score (TSS-6)[2]	-11.5	-10.0
p-value	—	0.343

[1] A responder is a patient achieving the following peak eosinophil counts: eosinophil count ≤4 cells per HPF in 5 gastric HPFs and/or eosinophil count ≤15 cells per HPF in 3 duodenal HPFs. Endpoint assessed at end of Week 24.

[2] TSS-6 is daily patient reported symptom questionnaire assessing 6 symptoms (abdominal pain, nausea, bloating, early satiety, abdominal cramping, and loss of appetite) on a scale from 0 to 10. Endpoint assessed as mean change from baseline to Weeks 23-24.

Post-hoc Analyses

Although post-hoc analyses cannot be used to establish efficacy, these analyses can be helpful in generating hypothesis for future clinical studies. After conducting post-hoc analyses, we believe that the trial missed its symptomatic co-primary endpoint due to the inclusion of mild patients and/or patients who had not failed standard of care. In the study, the overall demographics, baseline characteristics, and disease burden as assessed by TSS-6 were well balanced across treatment groups and placebo. However, despite using similar inclusion criteria, our post-hoc analysis indicated that patients enrolled in the Phase 3 study (ENIGMA 2) had notably lower levels of tissue eosinophils, blood eosinophils, IgE, and history of prior EG/EoD diagnosis when compared to ENIGMA.

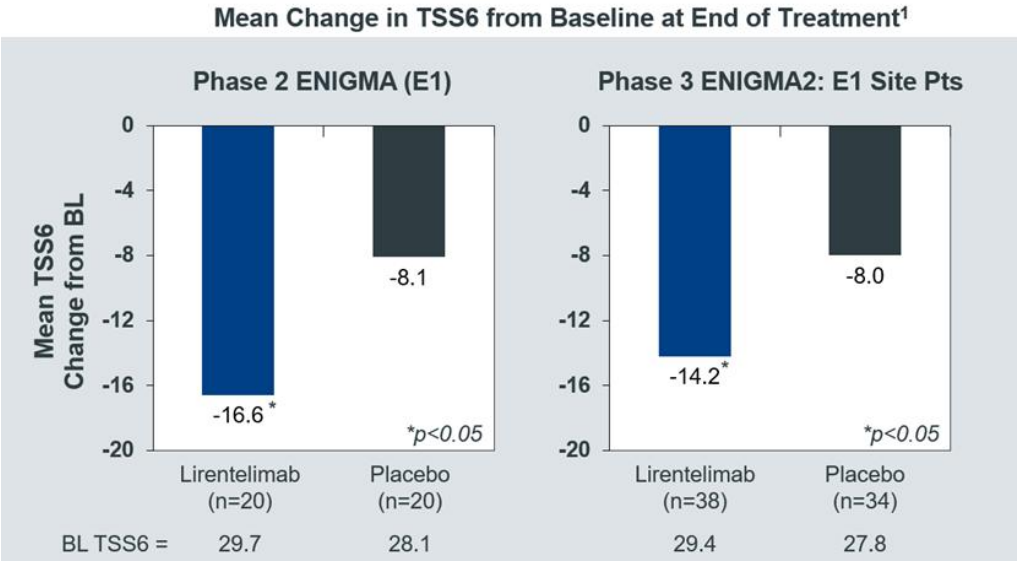
A post hoc analyses identified that new sites utilized in the conduct of the Phase 3 studied enrolled a high proportion of patients with low levels of tissue eosinophils, blood eosinophils, IgE, and prior history of EG/EoD, whereas sites previously participating in the Phase 2 study enrolled more severe patients with higher levels of these characteristics.

Figure 10: Baseline Demographics & Patient Characteristics: Post-hoc Site Comparison

Patient Characteristics	Ph2 ENIGMA1 (E1) n=65	Ph3 ENIGMA2 E1 Sites n=81	Ph3 ENIGMA2 Non-E1 Sites n=99
Age, median years (range)	40 (18-74)	45 (18-77)	40 (17-78)
Female sex, % (n)	62% (40)	59% (48)	70% (69)
History of EoE, % (n)	54% (35)	27% (22)	20% (20)
History of EG or EoD, % (n)	**80% (52)**	**47% (38)**	**17% (17)**
History of IBS, % (n)	**3% (2)**	**31% (25)**	**44% (44)**
History and background corticosteroid use, % (n)	42% (27)	43% (35)	30% (30)
Baseline use of physician prescribed diet regimen, % (n)	17% (11)	14% (11)	5% (5)
Gastric/duodenal eos/hpf in top 5/3 hpfs, mean ± SD	**84 ± 52**	**70 ± 53**	**50 ± 25**
Screening blood eos cells/µL, median (IQR)	**330 (160-720)**	**250 (170-665)**	**180 (110-290)**
Screening IgE kU/L, median (IQR)	**141 (44-361)**	**72 (29-166)**	**58 (17-165)**
Baseline Total Symptom Score (TSS) [0-60], mean ± SD	28 ± 12	29 ± 12	29 ± 11

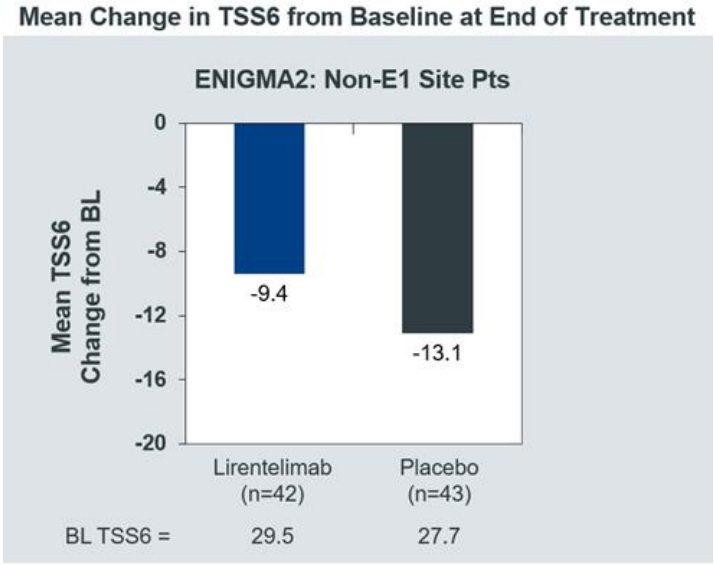
In a post hoc analyses of symptom improvement, sites with more severe patients with higher levels of tissue eosinophils, blood eosinophils, IgE levels, and prior history of EG/EoD, reported greater improvements on lirentelimab relative to placebo. The results suggest that future studies with lirentelimab should focus on more severe populations with higher levels of these characteristics.

Figure 11: Consistent Effects Observed in Post-hoc Analysis of ENIGMA1 Site Patients



1 = LS Means and p-values derived from ANCOVA/MMRM models

Figure 12: ENIGMA2: Post-hoc Analysis of Non-ENIGMA1 Site Patients



Safety

The safety results of the trial were generally consistent with previously reported lirentelimab studies. No new safety signals were observed. Mild to moderate infusion-related reactions (including flushing, feeling of warmth, headache, nausea, and/or dizziness etc.) occurred in 34% of lirentelimab-treated patients and 13% of placebo-treated patients.

Phase 3 EoD Study (EoDyssey)

We have a Phase 3 study in patients with EoD without EG ongoing and expect to report topline data in the third quarter of 2022. In this study, in addition to the duodenum, we plan to examine eosinophil and mast cell levels in the terminal ileum and colon before and after lirentelimab treatment. Evaluation of the terminal ileum and colon will help characterize EoD patients and could provide insights for further development of lirentelimab in colonic conditions such as eosinophilic colitis and ulcerative colitis. As of December 31, 2021, the study was fully enrolled and baseline characteristics of patients enrolled in this study are likely to be similar to those in ENIGMA 2. As a result, the EoDyssey trial could fail to meet the symptomatic co-primary endpoint when compared to placebo.

Future Studies in EG/EoD

We believe encouraging signs of efficacy were observed in the ENIGMA 1 study. In addition, post hoc analyses of ENIGMA 2 suggest that future studies with lirentelimab should focus on more severe populations with higher levels of tissue eosinophil counts, peripheral blood eosinophil counts, IgE levels with a prior history of EG/EoD. After completion of the EoDyssey study we plan to discuss our findings with the FDA to determine the design of a Phase 3 study using SC lirentelimab.

KRYPTOS: Phase 2/3 Study in Patients with EoE

Study Design

The KRYPTOS study, a randomized, double-blind, placebo-controlled Phase 2/3 trial of intravenous lirentelimab enrolled 276 patients with dysphagia and biopsy-confirmed EoE (≥15 eosinophils in 1 HPF). Patients were randomized 1:1:1 to receive: 1.0 mg/kg of lirentelimab for the first month followed by five doses of 3.0 mg/kg given monthly (b) monthly 1.0 mg/kg of lirentelimab (c) a monthly placebo. Disease symptoms were measured daily using a patient reported symptom questionnaire that assessed difficulty swallowing. Co-primary endpoints were (1) proportion of responders with ≤6 eosinophils in 1 HPF in the esophagus and (2) absolute change in dysphagia symptom questionnaire from baseline.

Study Results

Lirentelimab showed a statistically significant benefit when compared to placebo on the histology co-primary endpoint but failed to meet the symptomatic co-primary endpoint when compared to placebo.

Co-Primary Endpoints	**Placebo (n=92)**	**Lirentelimab Low Dose (n=93)**	**Lirentelimab High Dose (n=91)**
Histology Endpoint: Proportion of responders (eos ≤6 /hpf) as determined by esophageal tissue eosinophil counts[1]	10.9%	92.5%	87.9%
p-value	—	<0.0001	<0.0001
	DSQ Baseline: 34.2	DSQ Baseline: 36.4	DSQ Baseline: 35.2
Symptom Endpoint: Absolut mean change in patient reported Dysphagia Symptom Questionnaire (DSQ)[2]	-14.6	-11.9	-17.4
p-value	—	0.247	0.237

1 A responder is a patient achieving the following peak eosinophil counts: ≤6 eosinophils (eos) / high powered field (HPF) in 1 HPF in the esophagus. Endpoint assessed at end of Week 24.

2 DSQ is patient reported symptom questionnaire assessing difficulty swallowing. Endpoint assessed as absolute mean change from baseline to Weeks 23-24.

Post-hoc Analyses

After conducting post-hoc analyses, we believe that the trial missed its symptomatic co-primary endpoint due to the inclusion of mild patients and/or patients who had not failed standard of care. Although post-hoc analyses cannot be used to establish efficacy, these analyses can be helpful in generating hypothesis for future clinical

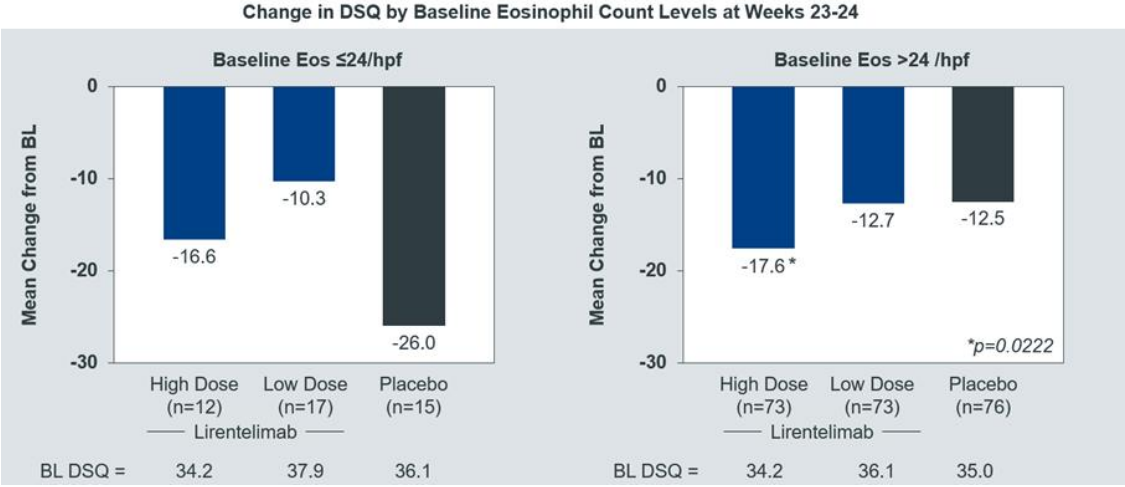
studies. In the study, the overall demographics, baseline characteristics, and disease burden as assessed by DSQ were well balanced across treatment groups and placebo. However, in reviewing the data with key opinion leaders ("KOL"), they noted that the percentage of patients with a history of esophageal dilatations and prior standard of care steroid and proton pump use was lower than expected, as was the mean peak eosinophil counts, IgE levels and duration of EoE history, indicating that the study enrolled a number of mild EoE patients and/or patients with eosinophilia not caused by EoE. Based on KOL input and medical literature indicating that a single peak eosinophil count of greater than 24 eos/hpf avoids mild EoE patients and patients with eosinophilia not caused by EoE, we conducted a post-hoc analysis of demographics and symptoms improvements using this threshold.

Patients with tissue biopsies containing greater than 24 eos/hpf had higher blood eosinophils, tissue eosinophils and IgE levels as well as more prior use of topical steroids and proton pump inhibitors, consistent with this threshold identifying more severe patients. In contrast, patients with less than 24 eos/hpf had lower levels of these characteristics. In the more severe patients with above 24 eos/hpf, improvements in dysphagia symptoms were observed in the high dose lirentelimab group relative to placebo. The results suggest that future studies with lirentelimab should focus on more severe populations with higher tissue eosinophil levels, IgE levels and more prior use of steroid and proton pump inhibitors.

Figure 13: Post-hoc Analysis of Baseline Demographics and Patient Characteristics By Peak Esophageal Eosinophils

	Peak Esophageal Eosinophil Counts ≤24/hpf			Peak Esophageal Eosinophil Counts >24/hpf		
Patient Characteristics	HD Lirentelimab (n=14)	LD Lirentelimab (n=18)	Placebo (n=16)	HD Lirentelimab (n=77)	LD Lirentelimab (n=75)	Placebo (n=76)
Age, median years (range)	35.5 (15 - 67)	33.5 (15 - 67)	43.5 (20 - 68)	29 (12 - 69)	34 (12 - 67)	30 (12 - 70)
Female sex, % (n)	43% (6)	44% (8)	38% (6)	26% (20)	43% (32)	41% (31)
History of EoE, % (n)	79% (11)	83% (15)	94% (15)	91% (70)	92% (69)	93% (71)
Duration of EoE, median years (range) [mean]	4 (1 - 19) [6.5]	4 (0 - 11) [5.0]	4 (0 - 12) [4.9]	4 (0 - 38) [6.3]	5 (0 - 56) [7.7]	5 (0 - 18) [5.2]
History of proton pump inhibitor use for EoE, % (n)	**21% (3)**	**11% (2)**	**0%**	**23% (18)**	**25% (19)**	**28% (21)**
History of swallowed topical steroid for EoE, % (n)	**7% (1)**	**22% (4)**	**6% (1)**	**22% (17)**	**16% (12)**	**24% (18)**
History of esophageal dilatations, n (%)	**14% (2)**	**17% (3)**	**6% (1)**	**3% (2)**	**4% (3)**	**8% (6)**
Number of prior esophageal dilatations, mean ± SD	3 ± 1	3 ± 1	2 ± 0	2 ± 1	2 ± 1	1 ± 1
History of atopy, % (n)	79% (11)	67% (12)	56% (9)	75% (58)	72% (54)	84% (64)
Peak esophageal eosinophil counts/hpf, mean ± SD	**20 ± 3**	**19 ± 3**	**20 ± 3**	**66 ± 31**	**71 ± 32**	**67 ± 30**
Peak esophageal eos/hpf in distal location, mean ± SD	**15 ± 7**	**17 ± 4**	**17 ± 7**	**54 ± 32**	**59 ± 31**	**55 ± 29**
Peak esophageal eos/hpf in proximal/mid location, mean ± SD	**13 ± 9**	**7 ± 9**	**10 ± 9**	**48 ± 29**	**54 ± 37**	**46 ± 35**
Peripheral blood eosinophils cells/µL, median (IQR)	310 (213 - 430)	175 (143 - 245)	220 (98 - 400)	300 (240 - 470)	300 (210 - 500)	380 (240 - 455)
Serum IgE, kU/L, median (IQR)	**83 (33 - 348)**	**64 (21 - 168)**	**65 (24 - 140)**	**105 (54 - 349)**	**117 (46 - 314)**	**98 (33 - 255)**
Baseline DSQ [0-84], mean ± SD	34 ± 10	38 ± 11	36 ± 10	34 ± 12	36 ± 12	35 ± 13

Figure 14: Post-hoc Analysis DSQ Response by Baseline Peak Eosinophil Count



* LS Means and HD lirentelimab from placebo p-values derived from MMRM model

Safety

The safety results of the trial were generally consistent with previously reported lirentelimab studies. No new safety signals were observed. Mild to moderate infusion-related reactions (including flushing, feeling of warmth, headache, nausea, and/or dizziness etc.) occurred in 39% of high dose lirentelimab- treated patients, 26% of low dose lirentelimab-treated patients and 12% of placebo-treated patients.

Future Studies in EoE

We believe encouraging signs of efficacy were observed in post hoc analyses of the KRYPTOS study, although post hoc analyses cannot be used to demonstrate efficacy. The post hoc analyses suggest that future studies with lirentelimab should focus on more severe populations with higher tissue eosinophil levels, IgE levels and more prior use of steroid and proton pump inhibitors. We are planning to discuss our finding with the FDA with the goal of initiating a Phase 3 study in EoE with SC lirentelimab in 2022.

Mast Cell Gastrointestinal Disease

During the enrollment phase of the ENIGMA study, we identified a group of patients who were symptomatic but upon biopsy had ≥ 30 stomach and/or duodenal mast cell counts in the absence of elevated eosinophils (<30 eosinophils/HPF). The presence of elevated mast cell counts and lack of elevated eosinophils or other cell type suggests that these patients may suffer from mast cell driven gastrointestinal symptoms. We refer to this condition as Mast Cell Gastrointestinal Disease (“MGID”). As detailed above, we conducted a prospective prevalence study examining the rates of elevated eosinophil and mast cell levels in 556 patients with chronic unexplained gastrointestinal symptoms or FGIDs such as IBS and FD. 73% (405 of 556) of patients screened underwent endoscopy with biopsy. Of the patients biopsied, 50% (204 of 405) met the histologic criteria for MGID, representing 37% (204 of 556) of patients screened. The results suggest that a large number of patients meet the criteria we established for MGID.

We have conducted a proof of concept Phase 1 study with lirentelimab in patients with MGID. The open-label, multi-dose, 6-month, Phase 1 study of lirentelimab consisted of seven patients with moderate to severe gastrointestinal symptoms and elevated mast cells (≥30 mast cells/HPF in at least 5 HPFs in the stomach and/or ≥30 mast cells/HPF in at least 3 HPFs in the duodenum) who did not have >30 eosinophils/HPF. Patients received 0.3 mg/kg of lirentelimab for the first dose, followed by 1.0 mg/kg the following month, then monthly doses of 3.0 mg/kg for four additional months. Disease symptoms were assessed using the patient reported outcome (“PRO”) questionnaire used in our Phase 2 (ENIGMA) and Phase 3 EG and/or EoD studies (Total Symptom Score TSS-8:

abdominal pain, nausea, vomiting, early satiety, loss of appetite, abdominal cramping, bloating, and diarrhea). Six-month treatment with lirentelimab resulted in a 64% mean reduction in TSS-8 compared to baseline and five of seven (71%) patients had >50% reduction in TSS-8. The treatment effect of lirentelimab in this open label study was similar to that observed with lirentelimab in patients with EG and/or EoD in the Phase 2 ENIGMA Study.

Chronic Urticaria

Disease Overview

Chronic urticaria ("CU") is a group of mast cell driven skin conditions which are characterized by recurrent transient pruritic wheal and flare type skin reactions and, in roughly 40% of patients, angioedema. Symptoms include hives, itching, redness, burning, warmth, tingling and irritation of the skin. Patients with CU are often severely impaired in their quality of life, with negative effects on sleep, daily activities, school/work life and social interactions. Urticaria symptoms are caused by degranulation of dermal mast cells, with IgE signaling believed to contribute to mast cell activation in many cases. The most common forms of CU are chronic spontaneous urticaria ("CSU"), cholinergic urticaria and symptomatic dermatographism.

Despite sharing similar inflammatory pathology, the various forms of urticaria differ in the triggers that elicit the inflammatory response and symptoms. Patients with cholinergic urticaria typically develop symptoms a few minutes after exercise or passive warming in a bath or shower. In some cholinergic patients, emotional stress or hot and spicy food or beverages can also elicit symptoms. Symptomatic dermatographism is characterized by hives and pruritis following a minor stroking pressure, rubbing or scratching of the skin. In CSU, pruritic wheal-and-flare-type skin reactions spontaneously appear on the skin at any time of the day or night. In most CSU patients, an underlying cause of CSU cannot be identified making a causal and/or curative treatment difficult. We estimate that approximately 200,000-500,000 patients with severe CSU, cholinergic urticaria and symptomatic dermatographism could be candidates for therapy with lirentelimab in the United States.

Current Therapies and Limitations

The current treatment guidelines for the management of all forms of urticaria recommend the use of non-sedating oral H1-antihistamines as first-line therapy. For patients who do not respond to standard doses of H1-antihistamines, doses are increased to as high as four times the standard dose. Though this can increase the response rates, side effects also increase, including sedation and anticholinergic effects, such as dry mouth, blurred vision, urinary retention and constipation. Patients who do not respond to or are unable to tolerate high dose antihistamines have few options. For cholinergic urticaria and symptomatic dermatographism patients, it is recommended that they avoid target triggers such as overheated spaces, hot baths/showers, exercise, specific food allergens and excessive contact. For antihistamine refractory patients with CSU, the only currently approved treatment is Xolair, a monoclonal anti-IgE antibody. Unfortunately, approximately 60% of CSU patients continue to have symptoms despite treatment with Xolair.

Phase 2 Study Design and Results

We conducted an open-label Phase 2 study with lirentelimab in patients with uncontrolled CU despite treatment with H1 antihistamines at up to 4x the labeled dose. The study enrolled four cohorts consisting of 13 Xolair naïve patients with CSU, 11 Xolair refractory patients with CSU (average duration of Xolair treatment 10 months at doses as high as 600mg/month), 11 patients with cholinergic urticaria, and 10 patients with symptomatic dermographism. Baseline symptom scores, as measured by Urticaria Control Test ("UCT") and Urticaria Activity Score ("UAS7") were collected over a 4-week screening period. Patients with baseline UCT scores of less than 12, indicative of poorly controlled urticaria, were enrolled in the study and treated with up to 6 doses of lirentelimab given once monthly. Patients received an initial dose of 0.3 mg/kg at baseline, followed by a dose of 1.0 mg/kg on day 28, and then received monthly doses of either 1.0 or 3.0 mg/kg for a total of 6 doses. The primary endpoint of the trial was patient-reported symptoms measured by the UCT. Secondary endpoints include safety and tolerability, as well as patient-reported symptoms as measured by UAS7 (CSU patients only), pulse controlled ergometry (cholinergic urticaria patients only), and Fric testing (symptomatic dermographism patients only).

Results for each cohort are shown in Figure 15. Patients in all cohorts reported high levels of disease control and some patients experienced complete resolution of symptoms while receiving lirentelimab. Importantly, lirentelimab also produced high levels of response in patients that were refractory to Xolair.

Figure 15. Data from the Phase 2 CU clinical trial

Xolair Naïve CSU Cohort (N=13)	Baseline	Week 22
Average UCT Score	3.2	14.2
UCT Complete Response	—	12/13 (92%)
UCT Partial Response	—	0/13 (0%)
UCT No Response	—	1/13 (8%)
Average UAS7 Score	18.5	4.6 (-75%)
Proportion with UAS7 ≤ 6	0%	8/13 (62%)
Proportion with UAS7 = 0	0%	7/13 (54%)
Proportion with ISS7 = 0	0%	7/13 (54%)
Proportion with HSS7 = 0	0%	10/13 (77%)

Xolair Failure CSU Cohort (N=11)	Baseline	Week 22
Average UCT Score	3.7	8.5
UCT Complete Response	—	4/11 (36%)
UCT Partial Response	—	2/11 (18%)
UCT No Response	—	5/11 (45%)
Average UAS7	28.7	14.7 (-49%)
Proportion with UAS7 ≤ 6	0%	2/11 (18%)
Proportion with UAS7 = 0	0%	1/11 (9%)
Proportion with ISS7 = 0	0%	1/11 (9%)
Proportion with HSS7 = 0	0%	1/11 (9%)

Cholinergic Urticaria Cohort (N=11)	Baseline	Week 22
Average UCT Score	5.4	11.8
UCT Complete Response	—	9/11 (82%)
UCT Partial Response	—	0/11 (0%)
UCT No Response	—	2/11 (18%)
Pulse Control Ergometry Exercise Test Negative	0%	7/7 (100%)

Symptomatic Dermographism Cohort (N=10)	Baseline	Week 22
Average UCT Score	5.7	9.1
UCT Complete Response	—	4/10 (40%)
UCT Partial Response	—	3/10 (30%)
UCT No Response	—	3/10 (30%)
Fric Test Itch Negative	0%	5/10 (50%)
Fric Test Hives Negative (Critical Friction Threshold)	0%	4/10 (40%)

Intravenous lirentelimab was generally well tolerated in the Phase 2 CU study. The most common adverse event was the occurrence of mild to moderate IRRs such as flushing, feeling of warmth, headache, nausea or dizziness, which occurred in 34% of first infusions and 4% of subsequent infusions.

Current and Future Studies

Based on the results from the Phase 2 CU study, we plan to initiate a Phase 2b study in patients with chronic spontaneous urticaria. The planned Phase 2b study in chronic spontaneous urticaria will be a multicentered, randomized, double-blind, placebo-controlled study in patients who are naïve to omalizumab and refractory to antihistamines. The primary end point of the trial will be the change from baseline in UAS7 at week 12.

Figure 16. Ongoing and Planned Lirentelimab CSU Clinical Studies

Study	Milestone
Phase 2b SC Chronic Spontaneous Urticaria	Initiation Expected Mid 2022

Atopic Dermatitis

Disease Overview

Atopic dermatitis ("AD") is a chronic pruritic inflammatory condition that is characterized by dry, red, itchy patches of skin. Multiple mechanisms contribute to the disease, including epithelial barrier impairment, systemic immune dysregulation, neuroinflammation, fibrotic remodeling and dysbiosis of skin microbiota. Crosstalk between eosinophils, mast cells, and sensory neurons has been shown to drive inflammation and chronic itch in atopic dermatitis via IgE, IL-4, IL-13, IL-33, and MRGPRX2. The disease affects approximately 16.5 million (7.3%) adults in the United States (US), of which approximately 6.6 million (40%) have moderate-to-severe disease.

Current Therapies and Limitations

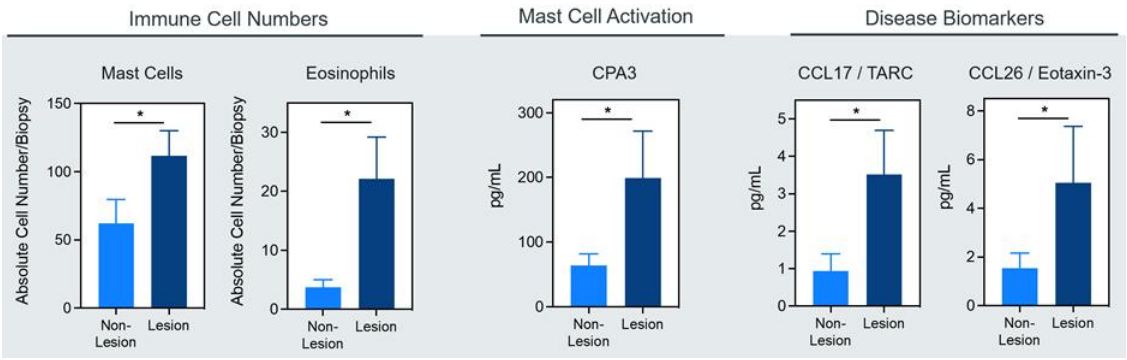
Atopic dermatitis is treated with oral antihistamines, topical moisturizers and emollients and topical steroids. Unfortunately, many patients continue to have lesions and symptoms despite these treatments and many of the drugs are not suitable for long-term treatment due to undesirable side effects. For patients who do not respond to these options or for more serious patients, FDA approved therapies include dupilumab (anti-IL-4 and IL-13 antibody), tralokinumab (anti IL-13 antibody), ruxolitinib (topical JAKi), abrocitinib (JAKi small molecule) and upadacitinib (JAKi small molecule). The IL-4 & IL-13 class was initially approved in 2017 for patients with moderate-to-severe AD. The JAKi class was initially for AD in 2021 however these drugs come with a boxed warning for serious infections, mortality, malignancies, major adverse cardiovascular events (MACE) and thrombosis. There remains a need for novel mechanisms of action to treat patients with AD.

Preclinical Data Showing Mast Cell and Eosinophil in Atopic Dermatitis Skin Lesions

In atopic dermatitis skin lesions, eosinophils and mast cells are elevated in number and mast cells are activated with high levels of surface-bound IgE. These cells have further been shown to induce chronic inflammation and itch via the wide array of activating receptors expressed on their cell surface, and through crosstalk with sensory neurons and other cell types.

Moreover, mast cells and eosinophils are major sources of IL-4 and IL-13, cytokines that have been shown to be clinically relevant mediators of inflammation and fibrosis.

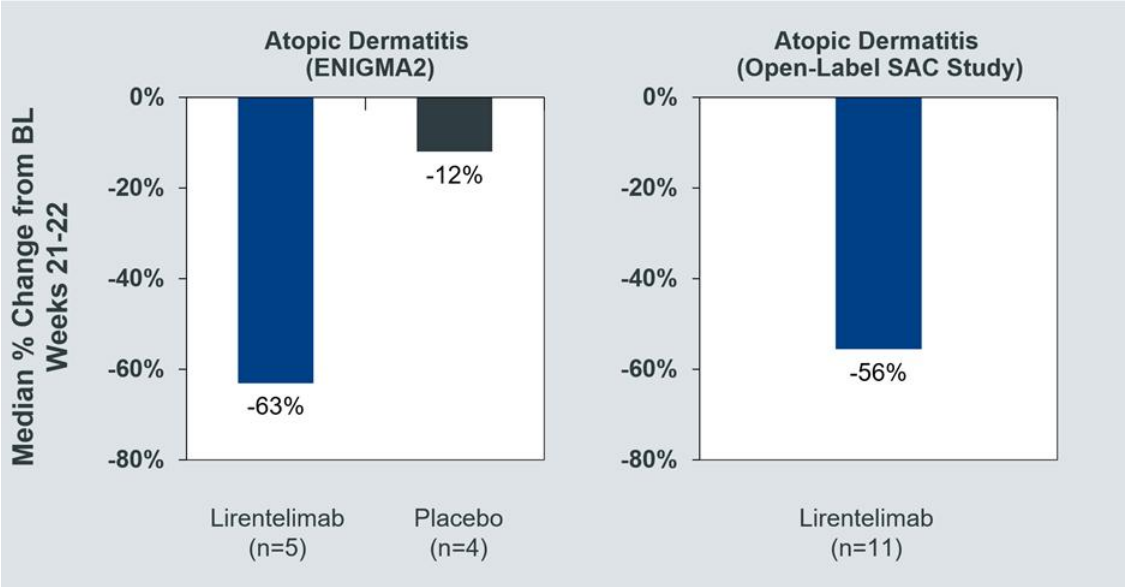
Figure 17: Mast Cells and Eosinophils Are Elevated in Atopic Dermatitis Skin Lesions



Observations in Patients with Atopic Dermatitis in Lirentelimab Clinical Studies

Evidence of activity was observed in two separate clinical studies of lirentelimab in patients with comorbid atopic dermatitis. In the EG/EoD Phase 3 study (ENIGMA 2), patients with comorbid atopic dermatitis were assessed using a daily questionnaire for the global disease severity and reported a decrease in disease severity of 63% compared to 12% on placebo (n=9). In a single-arm, Phase 1b severe allergic conjunctivitis study, patients with comorbid atopic dermatitis reported a 56% decrease in disease severity (n=11).

Figure 18: Improvement in Concomitant Atopic Dermatitis



Biomarker data from Phase 1b Severe Allergic Conjunctivitis Study

In the Phase 1b study in patients with Severe Allergic Conjunctivitis, clinically-relevant cytokines of atopic dermatitis were measured. These cytokines were measured via tear ducts to understand ocular inflammation and included IL-4, IL-13, CCL26/Eotaxin-3 as well as CCL/MIP-α. Upon lirentelimab dosing, these biomarkers showed meaningful decreases. Moreover these cytokines rebounded to baseline levels following study conclusion.

Current and Future Studies

We initiated a Phase 2 study in patients with moderate-to-severe atopic dermatitis. The Phase 2 study in atopic dermatitis is a 14-week, multicentered, randomized, double-blind, placebo-controlled trial that will enroll approximately 120 adult patients with moderate-to-severe disease who are inadequately controlled by topical treatments. Patients will be randomized 1:1 to receive a dose of subcutaneous 300mg lirentelimab every two weeks or placebo. The primary endpoint will be the proportion of patients who achieve eczema area and severity index (EASI)-75 at week 14.

Figure 19. Ongoing and Planned Lirentelimab Atopic Dermatitis Clinical Studies

Study	Milestone
Phase 2 SC Atopic Dermatitis	Initiated Q4 2021

Severe Allergic Conjunctivitis

Disease Overview

Atopic keratoconjunctivitis (“AKC”), vernal keratoconjunctivitis (“VKC”) and perennial allergic conjunctivitis (“PAC”) are a set of allergic ocular conjunctival diseases primarily associated with an IgE-mediated hypersensitivity reaction. We are focused on SAC, the severe forms of these collective diseases. These conditions are often caused by airborne allergens, such as grass and tree pollens, coming into contact with the eyes, which induces IgE mediated mast cell degranulation and allergic inflammation. The inflammatory mediators released by the mast cell result in inflammation and the infiltration of eosinophils, neutrophils and other immune cells. Eosinophils and mast cells are believed to be the main effector cells, with protease secretions directly damaging the

conjunctiva, and play a key role in triggering and maintaining the inflammatory response. Symptoms include itching, hyperemia, light sensitivity (or "photophobia"), pain, eye discharge and the sensation of having a foreign body in the eye. These symptoms can affect quality of life and daily activities, such as reading, driving and being in bright outdoor environments. In addition, patients with untreated disease, in particular those with VKC and AKC, can experience remodeling of the ocular surface tissues that can lead to vision loss. In addition to the primary symptoms of allergic conjunctivitis, a high correlation of allergic rhinitis, allergic asthma and atopic dermatitis comorbidities occur in this patient population. We believe that approximately 50,000-150,000 patients in the United States suffer from SAC and could be candidates for treatment with lirentelimab.

Current Therapies and Limitations

PAC is treated with topical antihistamines and mast cell stabilizers. More serious forms are treated with topical and systemic corticosteroids, cyclosporine and other immunomodulatory drugs. There are no drugs approved for AKC and VKC, and as a result, patients are typically treated similarly to patients with PAC. Unfortunately, many patients continue to have symptoms despite these topical and/or systemic treatments and many of the drugs are not suitable for long-term treatment due to undesirable side effects.

Study Design and Results

We conducted an open-label Phase 1 study with lirentelimab in patients with SAC. The trial was open-label, multi-dose, six-month study and enrolled 29 total SAC patients. Of the 29 patients, 13 patients had AKC, 15 patients had PAC, and one patient had VKC. Patients received a 0.3 mg/kg dose of lirentelimab for the first month, followed by a 1 mg/kg dose the next month, then monthly doses of 1 or 3 mg/kg for four additional months. The primary endpoint of the trial was safety and tolerability. Key secondary endpoints included patient-reported symptom measures of ocular itch, pain, lacrimation, photophobia and foreign body sensation. Patients administered lirentelimab reported a 78% median improvement in ocular symptoms by ACS and a 71% median improvement in physician assessed signs and symptoms using the OSS. In addition, a number of patients enrolled in the trial also had concomitant allergic rhinitis, asthma, and atopic dermatitis. Patients suffering from comorbid atopic dermatitis, asthma and allergic rhinitis, despite treatment with currently available therapies, reported improvements in their symptoms while receiving lirentelimab.

Intravenous lirentelimab was generally well tolerated. The most common adverse event was mild to moderate IRRs, such as flushing, feeling of warmth, headache, nausea, dizziness, which occurred mostly during the first infusion.

Figure 20. SAC Phase 1 Trial Results

ACS Symptom (N=29)	**Patient Assessed Median Change from Baseline to Weeks 21 to 22**
Itching	-75%
Light Sensitivity	-57%
Eye Pain	-75%
Foreign Body Sensation	-80%
Watering Eyes	-76%

OSS Symptom (N=29)	**Investigator Assessed Median Change from Baseline to Day 140**
Itching	-67%
Redness	-67%
Tearing	-50%
Chemosis	-100%

Comorbid Condition	Patient Assessed Change in Median Global Severity from Baseline to Weeks 21 to 22
Asthma (N=9)	-72%
Atopic Dermatitis (N=11)	-65%
Rhinitis (N=11)	-69%

Indolent Systemic Mastocytosis

Disease Overview

Indolent systemic mastocytosis ("ISM") is a rare disease characterized by the clonal proliferation and accumulation of mast cells in the bone marrow, respiratory and gastrointestinal tracts, and organs such as the skin, liver, spleen and brain. Common symptoms include pruritus, flushing, headache, cognitive impairment, fatigue, diarrhea, gastrointestinal cramps, hypotension and skin lesions, as well as an increased risk for osteoporosis and anaphylaxis, which in some cases can be life threatening. The symptoms of ISM are attributed to mast cell activation and the systemic release of mediators. Approximately 30,000 patients in the United States suffer from ISM. Lirentelimab has received orphan drug designation from the FDA and the European Medicines Agency ("EMA") for the treatment of ISM.

Current Therapies and Limitations

There are currently no drugs approved for the treatment of ISM by the FDA or EMA. ISM is treated with drugs targeting mast cell mediators, including antihistamines, cromolyn sodium and leukotriene blocking agents. Most patients' symptoms remain poorly controlled by these treatments. Glucocorticoids can provide temporary relief in some cases; however long-term treatment with steroids is not appropriate due to their many side effects.

Study Design and Results

Lirentelimab has been evaluated in an open-label, single and multiple ascending dose Phase 1 study in patients with ISM. The single dose portion of this trial was completed during the second quarter of 2017, with subsequent completion of the six-month multi-dose portion in the first quarter of 2019. The primary endpoints of the trial were safety and tolerability. Key secondary endpoints were the pharmacokinetic and pharmacodynamic profile of lirentelimab, including peripheral counts of eosinophils and patient-reported mastocytosis disease symptoms including itching, hives, skin flushing, diarrhea, abdominal pain, fatigue, headache, difficulty concentrating and muscle and joint pain. In the single dose portion, 13 patients received single escalating doses of 0.0003 to 1.0 mg/kg, including three patients receiving 0.3 mg/kg and three patients receiving 1.0 mg/kg of lirentelimab. Five out of six patients receiving 0.3 or 1.0 mg/kg reported to the study investigators that they had improvements in symptoms, including diarrhea, abdominal pain, fatigue, pruritus, difficulty concentrating and headaches.

In the multi-dose portion of the trial, 6 patients received six doses of 1.0 mg/kg of lirentelimab given monthly and 5 patients received 1.0 mg/kg for the first month and then monthly doses of 3.0 to 10 mg/kg of lirentelimab for the five months thereafter. Depletion of eosinophils was observed for all patients throughout the dosing period with lirentelimab. ISM symptoms and quality of life were assessed using the Mastocytosis Questionnaire ("MSQ"), an internally developed Patient Reported Outcome ("PRO") instrument, the Mastocytosis Questionnaire ("MSQ"), as well as two published questionnaires, the Mastocytosis Activity and Symptom Severity questionnaire ("MAS") and the Mastocytosis Quality of Life questionnaire ("MC-QoL"). The MSQ is a proprietary daily PRO Mastocytosis Questionnaire that we developed based on published guidance from the FDA on the development of PRO instruments and is expected to be used to help determine safety and efficacy in future clinical trials. The MSQ consists of nine symptom assessments, with each symptom being scored on a 0-10 scale with higher values representing greater symptom burden. Total score for the MSQ ranges from 0-90 points. For each PRO, baseline scores were collected over 14 to 28 days and compared to scores at Weeks 21 to 22, two weeks after the final dose of lirentelimab. PRO data obtained from patients in the multidose portion of the trial are presented in Figure 21. Consistent with the improvements reported in the single ascending dose study, lirentelimab produced clinically meaningful improvement in patient symptoms for multiple symptoms across all three PROs used in the study.

Figure 21. Patient Reported Outcomes from multi-dose portion of ISM trial

MSQ Symptom (N=8) [1]	Median Change from Baseline at Weeks 21 to 22
Itching	-56%
Hives	-38%
Flushing (#)	-46%
Abdominal Pain	-60%
Diarrhea	-49%
Headache	-50%
Fatigue	-47%
Difficulty Concentrating	-59%
Muscle Pain	-27%
Joint Pain	-26%

[1] The MSQ was not available for use in 3 patients.

MAS2 Symptom (N=11)	Median Change from Baseline at Weeks 21 to 22
Itching	-53%
Hives	-59%
Flushing	-57%
Abdominal Pain	-84%
Diarrhea	-72%
Headache	-57%
Fatigue	-22%
Difficulty Concentrating	-30%
Bone-Joint-Muscle Pain	-22%

MC-QoL Domain (N=11)	Median Change from Baseline at Day 145
Symptoms	-39%
Social Life / Functioning	-42%
Emotions	-57%
Skin	-44%

Intravenous lirentelimab was generally well tolerated in the Phase 1 ISM study. The most common adverse event was the occurrence of mild to moderate IRRs, such as flushing, feeling of warmth, headache, nausea or dizziness, which occurred mostly during the first infusion.

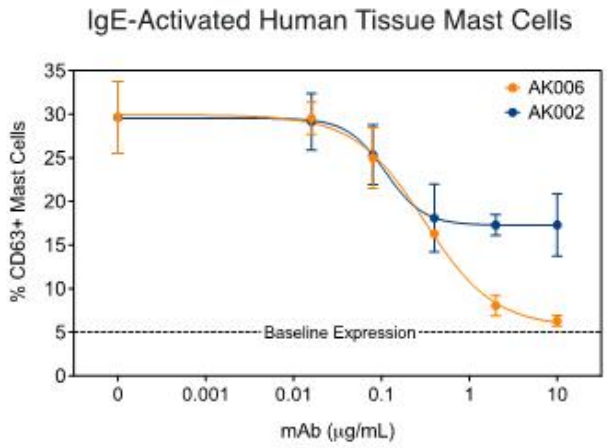
AK006 Preclinical Data

AK006 targets Siglec-6, an inhibitory receptor expressed selectively on mast cells. In preclinical studies, AK006, our humanized antibody to Siglec-6 reduces mast cell numbers and has been shown to have broader and deeper inhibition of mast cell activity than lirentelimab, including the ability to inhibit c-KIT activation. The increased inhibitory activity could give AK006 increased therapeutic activity while potentially avoiding toxicities associated with less selective mast cell targeting drugs.

AK006 induces potent mast cell inhibition in ex vivo human tissues

We developed an IgE-mediated mast cell activation assay in human tissue. In this assay, mast cells are activated via FceRI using an agonistic anti-FceRI antibody and mast cell activation is evaluated using CD63 expression by flow cytometry. CD63 is a activation marker found on mast cell granules and upon activation fuses with the plasma membrane making CD63 accessible to detection by flow cytometry. While AK002 showed potent mast cell inhibition, AK006 was able to provide deeper levels of inhibition.

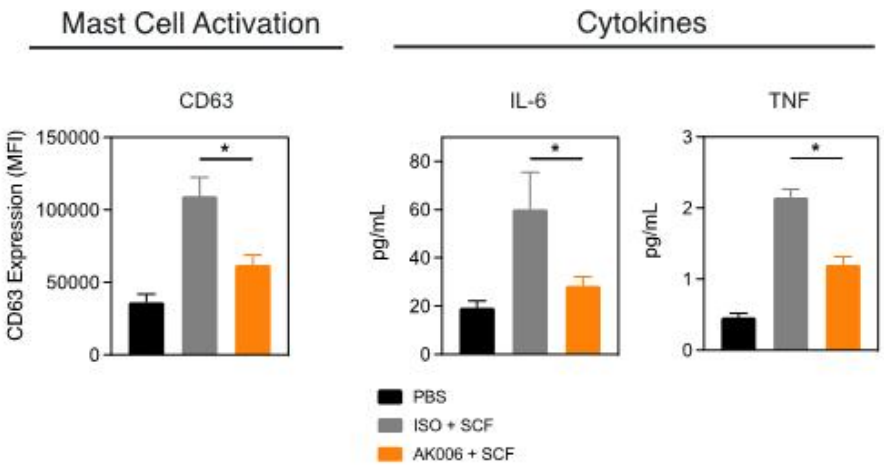
Figure 22: IgE-mediated mast cell activation in human tissue



AK006 inhibits KIT-mediated mast cell activation in vivo

AK006 also has been show to inhibit KIT activation of mast cells in vivo. Administration of stem cell factor (SCF), a potent KIT activator, to Siglec-6 transgenic mice induces mast cell activation and inflammation. AK006 reduced KIT-mediated mast cell activation as assessed by CD63 expression compared to sham treated mice (mice that did not receive SCF). In addition, AK006 treated mice displayed reduced levels of inflammatory mediators (TNF and IL-6) compared to isotype control mice.

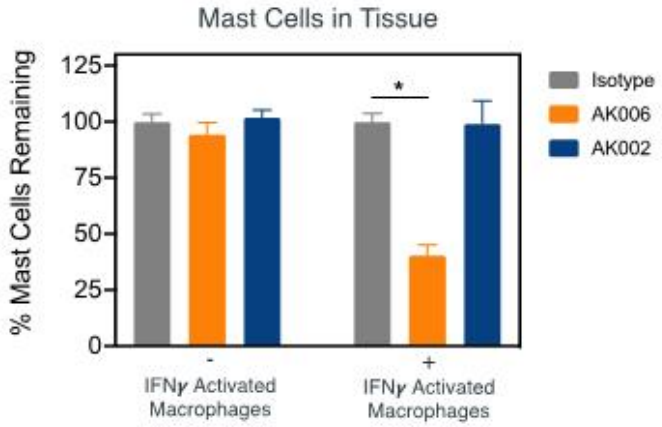
Figure 23: KIT-mediated mast cell activation and inflammation in Siglec-6 transgenic mice



AK006 reduces mast cells in ex vivo human tissue

In human tissue processed into single cell suspensions and cultured overnight with or without human macrophages activated with IFNg, AK006 significantly reduced human tissue mast cells in the presence of activated macrophages relative to an isotype control mAb (“ISO”). In contrast, AK002 does not reduce mast cells in the presence or absence of activated macrophages, suggesting AK006 has unique activity that reduces mast cells in the presence of activated effector cells, such as macrophages.

Figure 24: Mast cell numbers in *ex vivo* cultured human tissue



The above data suggests that AK006 selectively targets mast cells and has the potential to induce broad inhibition of mast cell activation and reduce mast cell numbers. This profile could give AK006 increased therapeutic activity while potentially avoiding toxicities associated with less selective mast cell targeting drugs.

We plan to begin human studies with AK006 in the first half of 2023.

Other Pipeline Programs

We are developing additional antibodies targeting novel inhibitory receptors expressed on key disease-driving immune cells. These antibodies have demonstrated in vitro and in vivo activity in murine models and are being evaluated for further development.

Competition

The biotechnology and pharmaceutical industries are characterized by rapid technological advancement, significant competition and an emphasis on intellectual property. We face potential competition from many different sources, including major and specialty pharmaceutical and biotechnology companies, academic research institutions, governmental agencies and public and private research institutions. Any product candidates that we successfully develop and commercialize will compete with current therapies and new therapies that may become available in the future. We believe that the key competitive factors affecting the success of any of our product candidates will include efficacy, safety profile, convenience, cost, level of promotional activity devoted to them and intellectual property protection.

We are not aware of any other company or organization that is conducting clinical trials of a product candidate that targets both mast cells and eosinophils, including any product candidate that specifically targets Siglec-8. The competition we may face with respect to each of the indications we are targeting with lirentelimab includes:

- ***EG, EoD and EoE.*** Currently, there are no therapies that have been approved by the FDA specifically for EG, EoD or EoE. Several companies, including but not limited to, Regeneron (dupilumab), AstraZeneca (benralizumab), Bristol Myers Squibb (cendakimab), Shire (oral budesonide), and Dr. Falk Pharma (oral budesonide) have or are conducting studies in these indications.
- ***ISM.*** We are not aware of any FDA-approved treatments for ISM. Blueprint Medicines is developing avapritinib in smoldering systemic mastocytosis and ISM.
- ***CU.*** Omalizumab (Roche and Novartis) is an FDA-approved drug for the treatment of CSU. We are not aware of any FDA-approved treatment options for cholinergic urticaria or symptomatic dermatographism. Companies conducting studies in chronic spontaneous urticaria include: Novartis

(ligelizumab), Roche / Genentech (fenebrutinib), Regeneron (dupilumab), Celldex (CDX-0159) and Third Harmonic (THB001).

- ***AD.*** Dupilumab (Regeneron), tralokinumab (Leo Pharma), ruxolitinib (Incyte), abrocitinib (Pfizer) and upadacitinib (Abbvie) are FDA-approved drugs for the treatment of AD. Several companies, including but not limited to, Eli Lilly (baricitinib & lebrikizumab), Bristol Myers (branebrutinib), Sanofi (rilzabrutinib), Pfizer (etrasimod) and AstraZeneca (benralizumab) have or are conducting studies in this indication.
- ***SAC.*** The products that are currently available for treatment of SAC only provide temporary relief for most patients and have little effect on moderate to severe cases. Companies conducting studies in SAC include Aldeyra (reproxalap).

Many of the companies against which we may compete have significantly greater financial resources and expertise in research and development, manufacturing, preclinical testing, conducting clinical trials, obtaining regulatory approvals and marketing approved products than we do. Smaller or early-stage companies may also prove to be significant competitors, particularly through collaborative arrangements with large and established companies. These competitors also compete with us in recruiting and retaining qualified scientific and management personnel and establishing clinical trial sites and patient registration for clinical trials, as well as in acquiring technologies complementary to, or necessary for, our programs.

Our commercial potential could be reduced or eliminated if our competitors develop and commercialize products that are safer or more effective, have fewer or less severe adverse events, and are more convenient or less expensive than products that we may develop. Our competitors also may obtain FDA or other regulatory approval for their products more rapidly than we can, which could result in our competitors establishing a strong market position before we are able to enter the market or could otherwise make our development more complicated.

Sales and Marketing

In light of our stage of development, we currently have limited marketing and sales capabilities. We hold worldwide commercialization rights to all of our product candidates. We intend to retain the rights to our compounds in key geographic markets for the time being, and plan to build our own focused, specialty sales force to commercialize approved products in the United States. We intend to build the necessary infrastructure and capabilities over time for the United States, and potentially other regions, following further advancement of our product candidates. Clinical data, the size of the addressable patient population, and the size of the commercial infrastructure and manufacturing needs may all influence or alter our commercialization plans. The responsibilities of the marketing and sales organization would include developing educational initiatives with respect to approved products and establishing relationships with researchers and practitioners in relevant fields of medicine.

Manufacturing

We must manufacture drug product for clinical trial use in compliance with cGMP regulations. The cGMP regulations include requirements relating to organization of personnel, buildings and facilities, equipment, control of components and drug product containers and closures, production and process controls, packaging and labeling controls, holding and distribution, laboratory controls, records and reports and returned or salvaged products. The manufacturing facilities for our product candidates must meet cGMP requirements and FDA or comparable foreign regulatory authority's satisfaction before any product is approved and our commercial products can be manufactured. Our third-party manufacturers will also be subject to periodic inspections of facilities by the FDA and other foreign authorities, including procedures and operations used in the testing and manufacture of our products to assess our compliance with applicable regulations.

We do not currently have the infrastructure or internal capability to manufacture our product candidates for use in clinical development and commercialization, and we currently have no plans to establish any manufacturing facilities. We rely, and expect to continue to rely, on third-party manufacturers for the production, packaging, labeling, storage, and distribution of our product candidates for pre-clinical testing and in compliance with cGMP requirements for clinical trials under our guidance. In the case of lirentelimab, to date we have relied on a single third-party manufacturer and we are currently in the process of developing alternative manufacturing capabilities. We expect to continue to rely on third-party manufacturers for the commercial supply of any of our product candidates if any of our product candidates obtain marketing approval. We have personnel with significant technical,

manufacturing, analytical, quality, regulatory, cGMP and project management experience to oversee our third-party manufacturers and to manage manufacturing and quality data and information for regulatory compliance purposes.

Failure to comply with statutory and regulatory requirements subjects a manufacturer to possible legal or regulatory action, including warning letters, the seizure or recall of products, injunctions, consent decrees placing significant restrictions on or suspending manufacturing operations and civil and criminal penalties. Contract manufacturers often encounter difficulties involving production yields, quality control and quality assurance, as well as shortages of qualified personnel. Any of these actions or events could have a material impact on the availability of our products.

In-Licensing Agreements

We have entered into two in-licensing agreements with third-parties for the development, manufacturing and commercialization of our products including lirentelimab. The specific terms of the individual agreements are discussed in further detail below.

Exclusive License Agreement with The Johns Hopkins University

We have exclusively licensed intellectual property from The Johns Hopkins University ("JHU") in a license agreement dated December 20, 2013 and amended and restated September 30, 2016. In December 2013, we entered into an agreement with JHU for an exclusive worldwide license to develop and commercialize for the treatment and prevention of disease products covered by the JHU licensed patent rights or derived from materials provided by JHU. In September 2016, we and JHU amended and restated the license agreement to an exclusive worldwide license to develop and commercialize in all fields products covered by the licensed patent rights, or derived from materials provided by JHU.

Under the license agreement we are obligated to make payments to JHU for therapeutic products aggregating up to $4.0 million based on achieving specified development and regulatory approval milestones. We will also pay single-digit royalties to JHU based on net sales of each licensed therapeutic product by us and our affiliates and sublicensees and have up to a low six-digit dollar minimum annual royalty payment. In addition, in the event we sublicense the JHU intellectual property, we are obligated to pay JHU a specified portion of income we receive from sublicensing.

Our royalty obligation with respect to each licensed product in a country extends until the later of the expiration of the last-to-expire patent licensed from JHU covering the licensed product in the country or the expiration of a specified number of years after the first commercial sale of any licensed product in any country. The last expiration date of patents licensed under the agreement was 2021 in all applicable countries, in the absence of any patent extensions that may be available for such patents

Non-Exclusive License Agreement with BioWa Inc. and Lonza Sales AG

We have licensed on a non-exclusive basis intellectual property from BioWa Inc. ("BioWa") and Lonza pursuant to a license agreement dated October 31, 2013. The agreement grants Allakos a non-exclusive worldwide license to develop and commercialize certain products manufactured in a particular mammalian host cell line for the prevention, diagnosis or treatment of human disease.

Under the license agreement, we are obligated to pay BioWa an annual commercial license fee of $40,000 until such time as BioWa receives royalty payments. We may also become obligated to make payments to BioWa aggregating up to $41.0 million based on achieving specified milestones, and to pay low single-digit royalties to BioWa based on net sales of licensed product by us and our affiliates and sublicensees. Our royalty obligation to BioWa with respect to each licensed product in a country extends until the later of the expiration of the last-to-expire licensed patent covering the licensed product in the country or the expiration of either regulatory exclusivity or a specified number of years after the first commercial sale of the licensed product in the country, whichever is later.

We may also pay low single-digit royalties to Lonza based on net sales of each licensed product by us and our affiliates and sublicensees. We will be required to pay an annual license fees to Lonza if we (or our strategic partner) manufactures a particular product using the particular cell line, or if we utilize a third party CMO to manufacture a product using such system. Our royalty obligation to Lonza with respect to each licensed product in a country extends until the later of the expiration of the last-to-expire licensed patent covering the licensed product in the country or a specified number of years after the first commercial sale of the licensed product in the country, whichever is later. The latest possible expiration date of patents licensed under the agreement is 2021 or 2023, depending on the country, in the absence of any patent extensions that may be available for such patents.

Total Royalty Burden

In aggregate, we anticipate our total royalty obligation on lirentelimab from our in-licensing agreements will be a mid-single digit percentage of net sales by us and our affiliates and sublicensees.

Government Regulation

Government authorities in the United States at the federal, state and local level and in other countries regulate, among other things, the research, development, testing, manufacture, quality control, approval, labeling, packaging, storage, record-keeping, promotion, advertising, distribution, post-approval monitoring and reporting, marketing and export and import of drug and biological products. Generally, before a new drug or biologic can be marketed, considerable data demonstrating its quality, safety and efficacy must be obtained, organized into a format specific for each regulatory authority, submitted for review and approved by the regulatory authority.

U.S. Drug Development

In the United States, the FDA regulates drugs under the Federal Food, Drug, and Cosmetic Act ("FDCA") and its implementing regulations, and biologics under the FDCA, the Public Health Service Act ("PHSA") and their implementing regulations. Both drugs and biologics also are subject to other federal, state and local statutes and regulations. The process of obtaining regulatory approvals and the subsequent compliance with appropriate federal, state, local and foreign statutes and regulations requires the expenditure of substantial time and financial resources. Failure to comply with the applicable U.S. requirements at any time during the product development process, approval process or after approval may subject an applicant to administrative or judicial sanctions. These sanctions could include, among other actions, the FDA's refusal to approve pending applications, withdrawal of an approval, a clinical hold, untitled or warning letters, product recalls or market withdrawals, product seizures, total or partial suspension of production or distribution, injunctions, fines, refusals of government contracts, restitution, disgorgement and civil or criminal penalties. Any agency or judicial enforcement action could have a material adverse effect on us.

Any future product candidates must be approved by the FDA through either a BLA or New Drug Application ("NDA") process before they may be legally marketed in the United States. The process generally involves the following:

- completion of extensive preclinical studies in accordance with applicable regulations, including nonclinical laboratory and animal tests that must be conducted in accordance with good laboratory practice ("GLP"), requirements;
- submission to the FDA of an Investigational New Drug ("IND") application, which must become effective before human clinical trials may begin;
- approval by an independent institutional review board ("IRB"), or ethics committee at each clinical trial site before each trial may be initiated;
- performance of adequate and well-controlled human clinical trials in accordance with applicable IND regulations, good clinical practice ("GCP"), requirements and other clinical trial-related regulations to establish the safety and efficacy of the investigational product for each proposed indication;
- submission to the FDA of an NDA or BLA and payment of user fees, if applicable;

- a determination by the FDA within 60 days of its receipt of an NDA or BLA to accept the filing for review;
- satisfactory completion of a FDA pre-approval inspection of the manufacturing facility or facilities where the drug or biologic will be produced to assess compliance with cGMP requirements to assure that the facilities, methods and controls are adequate to preserve the drug or biologic's identity, strength, quality and purity;
- satisfactory completion of FDA audit of the preclinical and/or clinical trial sites that generated the data in support of the NDA or BLA to assure compliance with GCPs and the integrity of the clinical data;
- FDA review and approval of the NDA or BLA, including consideration of the views of any FDA advisory committee, prior to any commercial marketing or sale of the drug or biologic in the United States; and
- compliance with any post-approval requirements, including the potential requirement to implement a Risk Evaluation and Mitigation Strategy ("REMS"), and the potential requirement to conduct post-approval studies.

The data required to support an NDA or BLA are generated in two distinct developmental stages: preclinical and clinical. The preclinical and clinical testing and approval process requires substantial time, effort and financial resources, and we cannot be certain that any approvals for any future product candidates will be granted on a timely basis, or at all.

Preclinical Studies and IND

The preclinical development stage generally involves laboratory evaluation of drug chemistry, formulation and stability, as well as in vitro and animal studies to evaluate toxicity, assess potential safety and efficacy, assess the potential for adverse events, support subsequent clinical testing, and in some cases to establish a rationale for therapeutic use. The conduct of preclinical studies is subject to federal regulations and requirements, including GLP regulations for safety/toxicology studies. The sponsor must submit the results of the preclinical studies, together with manufacturing information, analytical data, any available clinical data or literature and a proposed clinical protocol, to the FDA as part of the IND. Some long-term preclinical testing, such as animal tests of reproductive adverse events and carcinogenicity, may continue after the IND is submitted. An IND is a request for authorization from the FDA to administer an investigational product to humans, and must become effective before human clinical trials may begin. An IND automatically becomes effective 30 days after receipt by the FDA, unless before that time, the FDA raises concerns or questions related to one or more proposed clinical trials and places the trial on clinical hold. In such a case, the IND sponsor and the FDA must resolve any outstanding concerns before the clinical trial can begin. As a result, submission of an IND may not result in the FDA allowing clinical trials to commence.

Clinical Trials

The clinical stage of development involves the administration of the investigational product to human subjects under the supervision of qualified investigators in accordance with GCP requirements, which include the requirement that all research subjects provide their informed consent for their participation in any clinical trial. Investigators must also provide information to the clinical trial sponsors to allow the sponsors to disclose any financial interests and arrangements to the FDA that could affect the reliability or integrity of data submitted. Clinical trials are conducted under protocols detailing, among other things, the objectives of the clinical trial, dosing procedures, subject selection and exclusion criteria and the parameters to be used to monitor subject safety and assess efficacy. Each protocol, and any subsequent amendments to the protocol, must be submitted to the FDA as part of the IND. Furthermore, each clinical trial must be reviewed and approved by an IRB for each institution at which the clinical trial will be conducted to ensure that the risks to individuals participating in the clinical trials are minimized and are reasonable in relation to anticipated benefits. The IRB also approves the informed consent form that must be provided to each clinical trial subject or his or her legal representative, and must monitor the clinical trial until completed. There also are requirements governing the reporting of ongoing clinical trials and completed clinical trial results to public registries. The manufacture of investigational drugs for the conduct of human clinical trials is subject to cGMP requirements.

A sponsor who wishes to conduct a clinical trial outside of the United States may, but need not, obtain FDA authorization to conduct the clinical trial under an IND. If a foreign clinical trial is not conducted under an IND, the sponsor may submit data from the clinical trial to the FDA in support of an NDA or BLA. The FDA will accept a well-designed and well-conducted foreign clinical trial not conducted under an IND if the trial was conducted in accordance with GCP requirements and the FDA is able to validate the data through an onsite inspection if deemed necessary.

Clinical trials in the United States generally are conducted in three sequential phases, known as Phase 1, Phase 2 and Phase 3, and may be combined or overlap.

- Phase 1 clinical trials generally involve a small number of healthy volunteers or disease-affected subjects who are initially exposed to a single dose and then multiple doses of the product candidate. The primary purpose of these clinical trials is to assess the metabolism, pharmacologic action, tolerability and safety of the drug.
- Phase 2 clinical trials involve studies in disease-affected subjects to determine the dose required to produce the desired benefits. At the same time, safety and further PK and PD information is collected, possible adverse effects and safety risks are identified and a preliminary evaluation of efficacy is conducted.
- Phase 3 clinical trials generally involve a large number of subjects at multiple sites and are designed to provide the data necessary to demonstrate the effectiveness of the product for its intended use, its safety in use and to establish the overall benefit/risk relationship of the product and provide an adequate basis for product labeling and approval. These trials may include comparisons with placebo and/or other comparator treatments. The duration of treatment is often extended to mimic the actual use of a product during marketing.

Post-approval trials, sometimes referred to as Phase 4 clinical trials, may be conducted after initial marketing approval. These trials are used to gain additional experience from the treatment of patients in the intended therapeutic indication. In certain instances, the FDA may mandate the performance of Phase 4 clinical trials as a condition of approval of an NDA or BLA. The results of Phase 4 trials may confirm the effectiveness of a product candidate and may provide important safety information.

Progress reports detailing the results of the clinical trials, among other information, must be submitted at least annually to the FDA and written IND safety reports must be submitted to the FDA and the investigators for serious and unexpected suspected adverse events, findings from other studies suggesting a significant risk to humans exposed to the drug or biologic, findings from animal or *in vitro* testing that suggest a significant risk for human subjects and any clinically important increase in the rate of a serious suspected adverse reaction over that listed in the protocol or investigator brochure.

Phase 1, Phase 2 and Phase 3 clinical trials may not be completed successfully within any specified period, if at all. The FDA or the sponsor may suspend or terminate a clinical trial at any time on various grounds, including a finding that the research subjects or patients are being exposed to an unacceptable health risk. Similarly, an IRB can suspend or terminate approval of a clinical trial at its institution if the clinical trial is not being conducted in accordance with the IRB's requirements or if the drug or biologic has been associated with unexpected serious harm to patients. Additionally, some clinical trials are overseen by an independent group of qualified experts organized by the clinical trial sponsor, known as a data safety monitoring board or committee. This group provides authorization for whether a trial may move forward at designated check points based on access to certain data from the trial. Concurrent with clinical trials, companies usually complete additional animal studies and also must develop additional information about the chemistry and physical characteristics of the drug or biologic as well as finalize a process for manufacturing the product in commercial quantities in accordance with cGMP requirements. The manufacturing process must be capable of consistently producing quality batches of the product and, among other things, companies must develop methods for testing the identity, strength, quality and purity of the final product. Additionally, appropriate packaging must be selected and tested and stability studies must be conducted to demonstrate that our product candidates do not undergo unacceptable deterioration over their shelf life. We may also be required to develop and implement additional clinical trial policies and procedures as a result of the COVID-19

pandemic. For example, FDA has issued guidance documents on protecting subjects from the COVID-19 virus and cGMP considerations for responding to COVID-19 infection in employees in product manufacturing.

NDA/BLA Review Process

Following completion of the preclinical testing and clinical trials, data are analyzed to assess whether the investigational product is safe and effective for the proposed indicated use or uses. The results of preclinical studies and clinical trials are then submitted to the FDA as part of an NDA or BLA, along with proposed labeling, chemistry and manufacturing information to ensure product quality and other relevant data. In short, the NDA or BLA is a request for approval to market the drug or biologic for one or more specified indications and must contain proof of safety and efficacy for a drug or safety, purity and potency for a biologic. The application may include both negative and ambiguous results of preclinical studies and clinical trials, as well as positive findings. Data may come from company-sponsored clinical trials intended to test the safety and efficacy of a product's use or from a number of alternative sources, including studies initiated by investigators. To support marketing approval, the data submitted must be sufficient in quality and quantity to establish the safety and efficacy of the investigational product to the satisfaction of FDA. FDA approval of an NDA or BLA must be obtained before a drug or biologic may be marketed in the United States.

The submission of an NDA requires payment of a substantial user fee to the FDA, unless otherwise exempted, such as in the case of an NDA for a drug with orphan drug designation. Under the Prescription Drug User Fee Act ("PDUFA"), as amended, each NDA or BLA must be accompanied by a user fee. FDA adjusts the PDUFA user fees on an annual basis. According to the FDA's fee schedule, for the FDA's fiscal year 2022, the user fee for an application requiring clinical data, such as an NDA or BLA, is $3.12 million. PDUFA also imposes an annual program fee for human drugs and biologics of $0.3 million. Fee waivers or reductions are available in certain circumstances, including a waiver of the application fee for the first application filed by a small business. Additionally, no user fees are assessed on NDAs or BLAs for products designated as orphan drugs, unless the product also includes a non-orphan indication.

The FDA reviews all submitted NDAs and BLAs before it accepts them for filing, and may request additional information rather than accepting the NDA or BLA for filing. The FDA must make a decision on accepting an NDA or BLA for filing within 60 days of receipt. Once the submission is accepted for filing, the FDA begins an in-depth review of the NDA or BLA. Under the goals and policies agreed to by the FDA under PDUFA, the FDA has ten months, from the filing date, in which to complete its initial review of a new molecular-entity NDA or original BLA and respond to the applicant, and six months from the filing date of a new molecular-entity NDA or original BLA designated for priority review. The FDA does not always meet its PDUFA goal dates for standard and priority NDAs or BLAs, and the review process is often extended by FDA requests for additional information or clarification.

Before approving an NDA or BLA, the FDA will conduct a pre-approval inspection of the manufacturing facilities for the new product to determine whether they comply with cGMP requirements. The FDA will not approve the product unless it determines that the manufacturing processes and facilities are in compliance with cGMP requirements and adequate to assure consistent production of the product within required specifications. The FDA also may audit data from clinical trials to ensure compliance with GCP requirements. Additionally, the FDA may refer applications for novel drug products or drug products which present difficult questions of safety or efficacy to an advisory committee, typically a panel that includes clinicians and other experts, for review, evaluation and a recommendation as to whether the application should be approved and under what conditions, if any. The FDA is not bound by recommendations of an advisory committee, but it considers such recommendations when making decisions on approval. The FDA likely will reanalyze the clinical trial data, which could result in extensive discussions between the FDA and the applicant during the review process. After the FDA evaluates an NDA or BLA, it will issue an approval letter or a Complete Response Letter. An approval letter authorizes commercial marketing of the drug with specific prescribing information for specific indications. A Complete Response Letter indicates that the review cycle of the application is complete and the application will not be approved in its present form. A Complete Response Letter usually describes all of the specific deficiencies in the NDA or BLA identified by the FDA. The Complete Response Letter may require additional clinical data, additional pivotal Phase 3 clinical trial(s) and/or other significant and time-consuming requirements related to clinical trials, preclinical studies or manufacturing. If a Complete Response Letter is issued, the applicant may either resubmit the NDA or BLA,

addressing all of the deficiencies identified in the letter, or withdraw the application. Even if such data and information are submitted, the FDA may decide that the NDA or BLA does not satisfy the criteria for approval. Data obtained from clinical trials are not always conclusive and the FDA may interpret data differently than we interpret the same data.

Orphan Drugs

Under the Orphan Drug Act, the FDA may grant orphan designation to a drug or biological product intended to treat a rare disease or condition, which is generally a disease or condition that affects fewer than 200,000 individuals in the United States, or more than 200,000 individuals in the United States and for which there is no reasonable expectation that the cost of developing and making the product available in the United States for this type of disease or condition will be recovered from sales of the product.

Orphan drug designation must be requested before submitting an NDA or BLA. After the FDA grants orphan drug designation, the identity of the therapeutic agent and its potential orphan use are disclosed publicly by the FDA. Orphan drug designation does not convey any advantage in or shorten the duration of the regulatory review and approval process.

If a product that has orphan designation subsequently receives the first FDA approval for the disease or condition for which it has such designation or for a select indication or use within the rare disease or condition for which it was designated, the product generally will be receiving orphan drug exclusivity, which means that the FDA may not approve any other applications to market the same drug for the same indication for seven years from the date of such approval, except in limited circumstances, such as a showing of clinical superiority to the product with orphan exclusivity by means of greater effectiveness, greater safety or providing a major contribution to patient care or in instances of drug supply issues. Competitors, however, may receive approval of either a different product for the same indication or the same product for a different indication but that could be used off-label in the orphan indication. Orphan drug exclusivity also could block the approval of one of our products for seven years if a competitor obtains approval before we do for the same product, as defined by the FDA, for the same indication we are seeking approval, or if a product candidate is determined to be contained within the scope of the competitor's product for the same indication or disease. If one of our products designated as an orphan drug receives marketing approval for an indication broader than that which is designated, it may not be entitled to orphan drug exclusivity. Orphan drug status in the European Union has similar, but not identical, requirements and benefits.

Expedited Development and Review Programs

The FDA has various programs, including Fast Track designation, Breakthrough Therapy designation, accelerated approval and Priority Review designation, which are intended to expedite or facilitate the process for reviewing new drugs and biologics that meet certain criteria.

The purpose of these programs is to ensure that therapies for serious conditions are approved and available to patients as soon as it can be concluded that the therapies' benefits justify their risks. Under the Fast Track program, the sponsor of a new drug candidate may request that FDA designate the drug candidate for a specific indication as a Fast Track drug concurrent with, or after, the IND submission for the drug candidate, but ideally no later than the pre-NDA meeting because many of the features of Fast Track designation will not apply after that time. To be eligible for a Fast Track designation, the FDA must determine, based on the request of a sponsor, that a product is intended to treat a serious or life-threatening disease or condition and nonclinical or clinical data demonstrate the potential to address an unmet medical need. The FDA will determine that a product has the potential to fill a medical need if it will provide a therapy where none exists or the condition is not adequately addressed by current available therapy. Fast Track designation provides additional opportunities for interaction with the FDA's review team and rolling review of NDA components before the completed application is submitted. For rolling submission, the sponsor provides a schedule for the submission of the sections of the NDA, the FDA agrees to accept sections of the NDA and determines that the schedule is acceptable, and the sponsor pays any required user fees upon submission of the first section of the NDA. However, the FDA's time period goal for reviewing an application does not begin until the last section of the NDA is submitted. The FDA may decide to rescind the Fast Track designation if it determines that the qualifying criteria no longer apply, and a sponsor may also withdraw Fast Track designation if the designation is no longer supported by emerging data or the drug development program is no longer being pursued.

Any product submitted to the FDA for marketing, including under a fast-track program, may be eligible for other types of FDA programs intended to expedite development and review, such as priority review and accelerated approval. Any product is eligible for priority review if it treats a serious or life-threatening condition and, if approved, would provide a significant improvement in safety and effectiveness compared to available therapies. A sponsor may request Priority Review designation of an NDA for a drug that is intended to treat a serious condition at the time of the original NDA (or efficacy supplement) submission. FDA may assign a Priority Review designation if FDA determines that the product, if approved, would provide a significant improvement in safety or effectiveness or any supplement that proposes a labeling change pursuant to a report on a pediatric study. A Priority Review designation means that the goal for the FDA to review an application is six months, rather than the standard review of ten months under the Prescription Drug User Fee Act ("PDUFA") goals. Under the current PDUFA performance goals, these six- and ten-month review periods are measured from the 60-day filing date rather than the receipt date for NDAs for new molecular entities ("NME"), which typically adds approximately two months to the timeline for review from the date of submission.

A product may also be eligible for accelerated approval, if it treats a serious or life-threatening condition and generally provides a meaningful advantage over available therapies. In addition, it must demonstrate an effect on a surrogate endpoint that is reasonably likely to predict clinical benefit or on a clinical endpoint that can be measured earlier than irreversible morbidity or mortality ("IMM"), that is reasonably likely to predict an effect on IMM irreversible morbidity or mortality or other clinical benefit(i.e., an intermediate clinical endpoint), taking into account the severity, rarity or prevalence of the condition and the availability or lack of alternative treatments. As a condition of approval, the FDA may require that a sponsor of a drug or biologic receiving accelerated approval perform adequate and well-controlled post-marketing clinical trials. Failure to conduct required post approval studies or confirm a clinical benefit during post marketing studies may lead to the FDA withdrawing the drug from the market. All promotional materials for drug candidates approved under accelerated approval regulations are subject to prior review by the FDA. If the FDA concludes that a drug or biologic shown to be effective can be safely used only if distribution or use is restricted, it may require such post-marketing restrictions, as it deems necessary to assure safe use of the product.

Additionally, a drug or biologic may be eligible for designation as a Breakthrough Therapy if the product is intended, alone or in combination with one or more other drugs or biologics, to treat a serious or life-threatening condition and preliminary clinical evidence indicates that the product may demonstrate substantial improvement over currently approved therapies on one or more clinically significant endpoints. The benefits of Breakthrough Therapy designation include the same benefits as Fast Track designation, plus intensive guidance from the FDA to ensure an efficient drug development program, organizational commitment to the development and review of the product, including involvement of senior managers. Like Fast Track products, Breakthrough Therapy products are also eligible for rolling review of the NDA. A designation may be rescinded if a product candidate no longer meets the qualifying criteria for breakthrough therapy. A sponsor may also withdraw breakthrough therapy designation if the designation is no longer supported by the emerging data or the drug development program is no longer being pursued.

Fast Track designation, priority review, accelerated approval and Breakthrough Therapy designation do not change the standards for approval, but may expedite the development or approval process.

Abbreviated Licensure Pathway of Biological Products as Biosimilar or Interchangeable

The Patient Protection and Affordable Care Act, or Affordable Care Act ("ACA"), signed into law in 2010, includes a subtitle called the Biologics Price Competition and Innovation Act of 2009 ("BPCIA"), created an abbreviated approval pathway for biological products shown to be highly similar to an FDA-licensed reference biological product. The BPCIA attempts to minimize duplicative testing, and thereby lower development costs and increase patient access to affordable treatments. An application for licensure of a biosimilar product must include information demonstrating biosimilarity based upon the following, unless the FDA determines otherwise:

- analytical studies demonstrating that the proposed biosimilar product is highly similar to the approved product notwithstanding minor differences in clinically inactive components;
- animal studies (including the assessment of toxicity); and
- a clinical trial or trials (including the assessment of immunogenicity and PK or PD) sufficient to demonstrate safety, purity and potency in one or more conditions for which the reference product is licensed and intended to be used.

In addition, an application must include information demonstrating that:

- the proposed biosimilar product and reference product utilize the same mechanism of action for the condition(s) of use prescribed, recommended or suggested in the proposed labeling, but only to the extent the mechanism(s) of action are known for the reference product;
- the condition or conditions of use prescribed, recommended or suggested in the labeling for the proposed biosimilar product have been previously approved for the reference product;
- the route of administration, the dosage form and the strength of the proposed biosimilar product are the same as those for the reference product; and
- the facility in which the biological product is manufactured, processed, packed or held meets standards designed to assure that the biological product continues to be safe, pure and potent.

Biosimilarity means that the biological product is highly similar to the reference product notwithstanding minor differences in clinically inactive components; and that there are no clinically meaningful differences between the biological product and the reference product in terms of the safety, purity and potency of the product. In addition, the law provides for a designation of "interchangeability" between the reference and biosimilar products, whereby the biosimilar may be substituted for the reference product without the intervention of the health care provider who prescribed the reference product. The higher standard of interchangeability must be demonstrated by information sufficient to show that:

- the proposed product is biosimilar to the reference product;
- the proposed product is expected to produce the same clinical result as the reference product in any given patient; and
- for a product that is administered more than once to an individual, the risk to the patient in terms of safety or diminished efficacy of alternating or switching between the biosimilar and the reference product is no greater than the risk of using the reference product without such alternation or switch.

FDA approval is required before a biosimilar may be marketed in the United States. However, complexities associated with the large and intricate structures of biological products and the process by which such products are manufactured pose significant hurdles to the FDA's implementation of the law that are still being worked out by the FDA. For example, the FDA has discretion over the kind and amount of scientific evidence—laboratory, preclinical and/or clinical—required to demonstrate biosimilarity to a licensed biological product.

The FDA intends to consider the totality of the evidence, provided by a sponsor to support a demonstration of biosimilarity, and recommends that sponsors use a stepwise approach in the development of their biosimilar products. Biosimilar product applications thus may not be required to duplicate the entirety of preclinical and clinical testing used to establish the underlying safety and effectiveness of the reference product. However, the FDA may refuse to approve a biosimilar application if there is insufficient information to show that the active ingredients are the same or to demonstrate that any impurities or differences in active ingredients do not affect the safety, purity

or potency of the biosimilar product. In addition, as with BLAs, biosimilar product applications will not be approved unless the product is manufactured in facilities designed to assure and preserve the biological product's safety, purity and potency.

The submission of a biosimilar application does not guarantee that the FDA will accept the application for filing and review, as the FDA may refuse to accept applications that it finds are insufficiently complete. The FDA will treat a biosimilar application or supplement as incomplete if, among other reasons, any applicable user fees assessed under the Biosimilar User Fee Act of 2012 have not been paid. In addition, the FDA may accept an application for filing but deny approval on the basis that the sponsor has not demonstrated biosimilarity, in which case the sponsor may choose to conduct further analytical, preclinical or clinical studies and submit a BLA for licensure as a new biological product.

The timing of final FDA approval of a biosimilar for commercial distribution depends on a variety of factors, including whether the manufacturer of the branded product is entitled to one or more statutory exclusivity periods, during which time the FDA is prohibited from approving any products that are biosimilar to the branded product. The FDA cannot approve a biosimilar application for twelve years from the date of first licensure of the reference product. Additionally, a biosimilar product sponsor may not submit an application for four years from the date of first licensure of the reference product. A reference product may also be entitled to exclusivity under other statutory provisions. For example, a reference product designated for a rare disease or condition (an "orphan drug") may be entitled to seven years of exclusivity, in which case no product that is biosimilar to the reference product may be approved until either the end of the twelve-year period provided under the biosimilarity statute or the end of the seven-year orphan drug exclusivity period, whichever occurs later. In certain circumstances, a regulatory exclusivity period can extend beyond the life of a patent, and thus block biosimilarity applications from being approved on or after the patent expiration date. In addition, the FDA may under certain circumstances extend the exclusivity period for the reference product by an additional six months if the FDA requests, and the manufacturer undertakes, studies on the effect of its product in children, a so-called pediatric extension.

The first biological product determined to be interchangeable with a branded product for any condition of use is also entitled to a period of exclusivity, during which time the FDA may not determine that another product is interchangeable with the reference product for any condition of use. This exclusivity period extends until the earlier of: (1) one year after the first commercial marketing of the first interchangeable product; (2) 18 months after resolution of a patent infringement against the applicant that submitted the application for the first interchangeable product, based on a final court decision regarding all of the patents in the litigation or dismissal of the litigation with or without prejudice; (3) 42 months after approval of the first interchangeable product, if a patent infringement suit against the applicant that submitted the application for the first interchangeable product is still ongoing or (4) 18 months after approval of the first interchangeable product if the applicant that submitted the application for the first interchangeable product has not been sued.

Post-Approval Requirements

Following approval of a new product, the manufacturer and the approved product are subject to continuing regulation by the FDA, including, among other things, monitoring and record-keeping requirements, requirements to report adverse experiences and comply with promotion and advertising requirements, which include restrictions on promoting drugs for unapproved uses or patient populations (known as "off-label use") and limitations on industry-sponsored scientific and educational activities. Although physicians may prescribe legally available drugs for off-label uses, manufacturers may not market or promote such uses. Prescription drug promotional materials must be submitted to the FDA in conjunction with their first use. Further, if there are any modifications to the drug or biologic, including changes in indications, labeling or manufacturing processes or facilities, the applicant may be required to submit and obtain FDA approval of a new NDA/BLA or NDA/BLA supplement, which may require the development of additional data or preclinical studies and clinical trials.

The FDA may also place other conditions on approvals including the requirement for a REMS, to assure the safe use of the product. A REMS could include medication guides, physician communication plans or elements to assure safe use, such as restricted distribution methods, patient registries and other risk minimization tools. Any of these limitations on approval or marketing could restrict the commercial promotion, distribution, prescription or dispensing of products. Product approvals may be withdrawn for non-compliance with regulatory standards or if problems occur following initial marketing.

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

- restrictions on the marketing or manufacturing of the product, complete withdrawal of the product from the market or product recalls;
- fines, warning letters or holds on post-approval clinical studies;
- refusal of the FDA to approve pending applications or supplements to approved applications;
- applications, or suspension or revocation of product license approvals;
- product seizure or detention, or refusal to permit the import or export of products; or
- injunctions or the imposition of civil or criminal penalties.

The FDA strictly regulates marketing, labeling, advertising and promotion of products that are placed on the market. Drugs and biologics may be promoted only for the approved indications and in accordance with the provisions of the approved label. The FDA and other agencies actively enforce the laws and regulations prohibiting the promotion of off-label uses, and a company that is found to have improperly promoted off-label uses may be subject to significant liability.

Other U.S. Regulatory Matters

Manufacturing, sales, promotion and other activities following product approval are also subject to regulation by numerous regulatory authorities in the United States in addition to the FDA, including the Centers for Medicare & Medicaid Services, other divisions of the Department of Health and Human Services, the Department of Justice, the Drug Enforcement Administration, the Consumer Product Safety Commission, the Federal Trade Commission, the Occupational Safety & Health Administration, the Environmental Protection Agency and state and local governments.

For example, in the United States, sales, marketing and scientific and educational programs also must comply with state and federal fraud and abuse laws. These laws include the federal Anti-Kickback Statute, which makes it illegal for any person, including a prescription drug manufacturer (or a party acting on its behalf), to knowingly and willfully solicit, receive, offer or pay any remuneration that is intended to induce or reward referrals, including the purchase, recommendation, order or prescription of a particular drug, for which payment may be made under a federal healthcare program, such as Medicare or Medicaid. Violations of this law are punishable by up to five years in prison, criminal fines, administrative civil money penalties and exclusion from participation in federal healthcare programs. Moreover, the ACA provides that the government may assert that a claim including items or services resulting from a violation of the federal Anti-Kickback Statute constitutes a false or fraudulent claim for purposes of the False Claims Act.

Pricing and rebate programs must comply with the Medicaid rebate requirements of the U.S. Omnibus Budget Reconciliation Act of 1990 and more recent requirements in the ACA. If products are made available to authorized users of the Federal Supply Schedule of the General Services Administration, additional laws and requirements apply. Products must meet applicable child-resistant packaging requirements under the U.S. Poison Prevention Packaging Act. Manufacturing, sales, promotion and other activities also are potentially subject to federal and state consumer protection and unfair competition laws.

The distribution of biologic and pharmaceutical products is subject to additional requirements and regulations, including extensive record-keeping, licensing, storage and security requirements intended to prevent the unauthorized sale of pharmaceutical products.

The failure to comply with any of these laws or regulatory requirements subjects firms to possible legal or regulatory action. Depending on the circumstances, failure to meet applicable regulatory requirements can result in criminal prosecution, fines or other penalties, injunctions, requests for recall, seizure of products, total or partial suspension of production, denial or withdrawal of product approvals or refusal to allow a firm to enter into supply contracts, including government contracts. Any action against us for violation of these laws, 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. Prohibitions or restrictions on sales or withdrawal of future products marketed by us could materially affect our business in an adverse way.

Changes in regulations, statutes or the interpretation of existing regulations could impact our business in the future by requiring, for example: (i) changes to our manufacturing arrangements; (ii) additions or modifications to product labeling; (iii) the recall or discontinuation of our products; or (iv) additional record-keeping requirements. If any such changes were to be imposed, they could adversely affect the operation of our business.

U.S. Patent-Term Restoration and Marketing Exclusivity

Depending upon the timing, duration and specifics of FDA approval of any future product candidates, some of our U.S. patents may be eligible for limited patent term extension under the Drug Price Competition and Patent Term Restoration Act of 1984 (the "Hatch-Waxman Act"). The Hatch-Waxman Act permits restoration of the patent term of up to five years as compensation for patent term lost during product development and FDA regulatory review process. Patent-term restoration, however, cannot extend the remaining term of a patent beyond a total of 14 years from the product's approval date. The patent-term restoration period is generally one-half the time between the effective date of an IND and the submission date of an NDA or BLA plus the time between the submission date of an NDA or BLA and the approval of that application, except that the review period is reduced by any time during which the applicant failed to exercise due diligence. Only one patent applicable to an approved drug is eligible for the extension and the application for the extension must be submitted prior to the expiration of the patent. The U.S. PTO, in consultation with the FDA, reviews and approves the application for any patent term extension or restoration. In the future, we may apply for restoration of patent term for our currently owned or licensed patents to add patent life beyond its current expiration date, depending on the expected length of the clinical trials and other factors involved in the filing of the relevant NDA or BLA.

Market exclusivity provisions under the FDCA also can delay the submission or the approval of certain applications. The FDCA provides a five-year period of non-patent marketing exclusivity within the United States to the first applicant to gain approval of a NDA for a new chemical entity. A drug is a new chemical entity if the FDA has not previously approved any other new drug containing the same active moiety, which is the molecule or ion responsible for the action of the drug substance. During the exclusivity period, the FDA may not accept for review an abbreviated new drug application ("ANDA"), or a 505(b)(2) NDA submitted by another company for another version of such drug where the applicant does not own or have a legal right of reference to all the data required for approval. However, an application may be submitted after four years if it contains a certification of patent invalidity or non-infringement. The FDCA also provides three years of marketing exclusivity for a NDA, 505(b)(2) NDA or supplement to an existing NDA if new clinical investigations, other than bioavailability studies, that were conducted or sponsored by the applicant are deemed by the FDA to be essential to the approval of the application, for example, new indications, dosages or strengths of an existing drug. This three-year exclusivity covers only the conditions of use associated with the new clinical investigations and does not prohibit the FDA from approving ANDAs for drugs containing the original active agent. Five-year and three-year exclusivity will not delay the submission or approval of a full NDA. However, an applicant submitting a full NDA would be required to conduct or obtain a right of reference to all of the preclinical studies and adequate and well-controlled clinical trials necessary to demonstrate safety and effectiveness.

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

European Union Drug Development

As in the United States, medicinal products can be marketed only if a marketing authorization from the competent regulatory agencies has been obtained.

Similar to the United States, the various phases of preclinical and clinical research in the European Union are subject to significant regulatory controls. Although the EU Clinical Trials Directive 2001/20/EC has sought to harmonize the EU clinical trials regulatory framework, setting out common rules for the control and authorization of clinical trials in the EU, the EU Member States have transposed and applied the provisions of the Directive differently. This has led to significant variations in the member state regimes. Under the current regime, before a clinical trial can be initiated it must be approved in each of the EU countries where the trial is to be conducted by two distinct bodies: the National Competent Authority (“NCA”), and one or more Ethics Committees (“ECs”). Under the current regime all suspected unexpected serious adverse reactions to the investigated drug that occur during the clinical trial have to be reported to the NCA and ECs of the Member State where they occurred.

The EU clinical trials legislation currently is undergoing a transition process mainly aimed at harmonizing and streamlining clinical-trial authorization, simplifying adverse-event reporting procedures, improving the supervision of clinical trials and increasing their transparency. Clinical Trials Regulation EU No 536/2014 ensures that the rules for conducting clinical trials in the EU will be identical. In the meantime, Clinical Trials Directive 2001/20/EC continues to govern all clinical trials performed in the EU.

European Union Drug Review and Approval

In the European Economic Area (“EEA”), which is comprised of the 27 Member States of the European Union (including Norway and excluding Croatia), Iceland and Liechtenstein, medicinal products can only be commercialized after obtaining a Marketing Authorization (“MA”). There are two types of marketing authorizations.

- The Community MA is issued by the European Commission through the Centralized Procedure, based on the opinion of the Committee for Medicinal Products for Human Use (“CHMP”), of the EMA, and is valid throughout the entire territory of the EEA. The Centralized Procedure is mandatory for certain types of products, such as biotechnology medicinal products, orphan medicinal products, advanced-therapy medicines such as gene-therapy, somatic cell-therapy or tissue-engineered medicines and medicinal products containing a new active substance indicated for the treatment of HIV, AIDS, cancer, neurodegenerative disorders, diabetes, auto-immune and other immune dysfunctions and viral diseases. The Centralized Procedure is optional for products containing a new active substance not yet authorized in the EEA, or for products that constitute a significant therapeutic, scientific or technical innovation or which are in the interest of public health in the EU.
- National MAs, which are issued by the competent authorities of the Member States of the EEA and only cover their respective territory, are available for products not falling within the mandatory scope of the Centralized Procedure. Where a product has already been authorized for marketing in a Member State of the EEA, this National MA can be recognized in another Member States through the Mutual Recognition Procedure. If the product has not received a National MA in any Member State at the time

of application, it can be approved simultaneously in various Member States through the Decentralized Procedure. Under the Decentralized Procedure an identical dossier is submitted to the competent authorities of each of the Member States in which the MA is sought, one of which is selected by the applicant as the Reference Member State ("RMS"). The competent authority of the RMS prepares a draft assessment report, a draft summary of the product characteristics ("SPC"), and a draft of the labeling and package leaflet, which are sent to the other Member States (referred to as the Member States Concerned) for their approval. If the Member States Concerned raise no objections, based on a potential serious risk to public health, to the assessment, SPC, labeling or packaging proposed by the RMS, the product is subsequently granted a national MA in all the Member States (i.e., in the RMS and the Member States Concerned).

Under the above described procedures, before granting the MA, the EMA or the competent authorities of the Member States of the EEA make an assessment of the risk-benefit balance of the product on the basis of scientific criteria concerning its quality, safety and efficacy.

Coverage and Reimbursement

Sales of our products will depend, in part, on the extent to which our products will be covered by third-party payors, such as government health programs, commercial insurance and managed healthcare organizations. In the United States no uniform policy of coverage and reimbursement for drug or biological products exists. Accordingly, decisions regarding the extent of coverage and amount of reimbursement to be provided for any of our products will be made on a payor-by-payor basis. As a result, the coverage determination process is often a time-consuming and costly process that will require us to provide scientific and clinical support for the use of our products to each payor separately, with no assurance that coverage and adequate reimbursement will be obtained.

The United States government, state legislatures and foreign governments have shown significant interest in implementing cost containment programs to limit the growth of government-paid health care costs, including price-controls, restrictions on reimbursement and requirements for substitution of generic products for branded prescription drugs. For example, the ACA contains provisions that may reduce the profitability of drug products through increased rebates for drugs reimbursed by Medicaid programs, extension of Medicaid rebates to Medicaid managed care plans, mandatory discounts for certain Medicare Part D beneficiaries and annual fees based on pharmaceutical companies' share of sales to federal health care programs. Adoption of general controls and measures, coupled with the tightening of restrictive policies in jurisdictions with existing controls and measures, could limit payments for pharmaceutical drugs.

The Medicaid Drug Rebate Program requires pharmaceutical manufacturers to enter into and have in effect a national rebate agreement with the Secretary of the Department of Health and Human Services as a condition for states to receive federal matching funds for the manufacturer's outpatient drugs furnished to Medicaid patients. The ACA made several changes to the Medicaid Drug Rebate Program, including increasing pharmaceutical manufacturers' rebate liability by raising the minimum basic Medicaid rebate on most branded prescription drugs from 15.1% of average manufacturer price ("AMP"), to 23.1% of AMP and adding a new rebate calculation for "line extensions" (i.e., new formulations, such as extended release formulations) of solid oral dosage forms of branded products, as well as potentially impacting their rebate liability by modifying the statutory definition of AMP. The ACA also expanded the universe of Medicaid utilization subject to drug rebates by requiring pharmaceutical manufacturers to pay rebates on Medicaid managed care utilization and by enlarging the population potentially eligible for Medicaid drug benefits. The Centers for Medicare & Medicaid Services ("CMS"), have proposed to expand Medicaid rebate liability to the territories of the United States as well.

The Medicare Prescription Drug, Improvement, and Modernization Act of 2003 ("MMA"), established the Medicare Part D program to provide a voluntary prescription drug benefit to Medicare beneficiaries. Under Part D, Medicare beneficiaries may enroll in prescription drug plans offered by private entities that provide coverage of outpatient prescription drugs. Unlike Medicare Part A and B, Part D coverage is not standardized. While all Medicare drug plans must give at least a standard level of coverage set by Medicare, Part D prescription drug plan sponsors are not required to pay for all covered Part D drugs, and each drug plan can develop its own drug formulary that identifies which drugs it will cover and at what tier or level. However, Part D prescription drug formularies must include drugs within each therapeutic category and class of covered Part D drugs, though not necessarily all the drugs in each category or class. Any formulary used by a Part D prescription drug plan must be

developed and reviewed by a pharmacy and therapeutic committee. Government payment for some of the costs of prescription drugs may increase demand for products for which we receive marketing approval. However, any negotiated prices for our products covered by a Part D prescription drug plan likely will be lower than the prices we might otherwise obtain. Moreover, while the MMA applies only to drug benefits for Medicare beneficiaries, private payors often follow Medicare coverage policy and payment limitations in setting their own payment rates. Any reduction in payment that results from the MMA may result in a similar reduction in payments from non-governmental payors.

For a drug product to receive federal reimbursement under the Medicaid or Medicare Part B programs or to be sold directly to U.S. government agencies, the manufacturer must extend discounts to entities eligible to participate in the 340B drug pricing program. The required 340B discount on a given product is calculated based on the AMP and Medicaid rebate amounts reported by the manufacturer. As of 2010, the ACA expanded the types of entities eligible to receive discounted 340B pricing, although, under the current state of the law, with the exception of children's hospitals, these newly eligible entities will not be eligible to receive discounted 340B pricing on orphan drugs. In addition, as 340B drug prices are determined based on AMP and Medicaid rebate data, the revisions to the Medicaid rebate formula and AMP definition described above could cause the required 340B discount to increase.

As noted above, the marketability of any products for which we receive regulatory approval for commercial sale may suffer if the government and third-party payors fail to provide adequate coverage and reimbursement. An increasing emphasis on cost containment measures in the United States has increased and we expect will continue to increase the pressure on pharmaceutical pricing. Coverage policies and third-party reimbursement rates may change at any time. Even if favorable coverage and reimbursement status is attained for one or more products for which we receive regulatory approval, less favorable coverage policies and reimbursement rates may be implemented in the future.

In addition, in most foreign countries, the proposed pricing for a drug must be approved before it may be lawfully marketed. The requirements governing drug pricing and reimbursement vary widely from country to country. For example, the European Union provides options for its member states to restrict the range of medicinal products for which their national health insurance systems provide reimbursement and to control the prices of medicinal products for human use. A member state may approve a specific price for the medicinal product or it may instead adopt a system of direct or indirect controls on the profitability of the company placing the medicinal product on the market. There can be no assurance that any country that has price controls or reimbursement limitations for pharmaceutical products will allow favorable reimbursement and pricing arrangements for any of our products. Historically, products launched in the European Union do not follow price structures of the United States and generally prices tend to be significantly lower.

Human Capital

We believe we must attract, develop, motivate and retain exceptional employees to achieve our objectives. To accomplish this, we offer competitive compensation, promote diversity and inclusion, and focus on employee health, safety and well-being. Our board of directors engages regularly with management on human capital matters. As of December 31, 2021, we had 192 full-time employees, 132 of whom were engaged in research and development activities. None of our employees are represented by a labor union or covered under a collective bargaining agreement. We consider our relationship with our employees to be strong based on engagement scores, employee comments and modest turnover.

Due to the clinical study results released in December 2021, our Board of Directors approved in February 2022, and we began implementing, a reorganization plan (the "Reorganization Plan") to reduce operating costs and better align our workforce with the new clinical development plans of our business. Under the Reorganization Plan, we are reducing our workforce by approximately 35%.

The management team and the Board of Directors and the Company consulted with outside compensation advisors to develop severance packages appropriate to the market conditions for similar situations and companies. At the time of departure from the Company, impacted employees are eligible to receive severance benefits and Company funded COBRA premiums. Additionally, the Company is providing job placement assistance and other services to help transitioning employees.

In addition, the Board of Directors approved, and management has implemented an employee retention program consisting of cash payments as well as grants of time-based RSUs and performance-based RSUs to the Company's employees not impacted by the reduction in force. Refer to Note 12 "Subsequent Events" to our financial statements for additional information.

Company Culture and Employee Development

We continue to build a culture that is both high performing and personally rewarding. We do this by clearly establishing a set of values to guide each of us.. We also look for opportunities to recognize employees fostering the culture as a way to reinforce these behaviors. Recognition is a key component in ensuring employee contributions are both seen and appreciated. We have developed several employee recognition programs to support that goal.

We support the growth of our employees through educational programs that enhance technical skills as well as leadership capabilities. We have developed a course for leaders at all levels to hone their skills in key aspects of what teams in today's environment need to thrive. The programs are conducted virtually so employees in all locations can participate equally. We have also developed an educational grant policy which supports employees in developing the skills relevant to their work at Allakos.

Health, Safety, and Wellness

The health, safety, and wellness of our employees is a priority in which we have always invested. These investments and the prioritization of employee health, safety, and wellness took on particular significance in 2020 and 2021 in light of COVID-19. We provide our employees and their families with access to a variety of innovative, flexible, and convenient health and wellness programs. Program benefits are intended to provide protection and security, so employees can have peace of mind concerning events that may require time away from work or that may impact their financial well-being. Additionally, we provide programs to help support employee physical and mental health by providing tools and resources to help them improve or maintain their health status, encourage engagement in healthy behaviors, and offer choices where possible so they are customized to meet their needs and the needs of their families.

In response to the COVID-19 pandemic, we implemented significant changes that we determined were in the best interest of our employees, as well as the communities in which we operate, in compliance with government regulations. This included having the vast majority of our employees work from home, while implementing additional safety measures for employees continuing to work on-site. To protect and support our essential team members, we have implemented health and safety measures that included providing personal protective equipment (PPE), instituting mandatory screening before accessing buildings and implementing protocols to address actual and suspected COVID-19 cases and potential exposure.

Compensation and Benefits

We provide compensation and benefits to help meet the needs of our employees. We benchmark our pay annually to ensure it is fair in comparison to local market conditions. In addition to base compensation, our employee programs include annual bonuses, stock incentive awards, an Employee Stock Purchase Plan, 401(k) matching, healthcare insurance benefits, health savings and flexible spending accounts, paid time off and family leave.

Ensuring fair and equitable pay is integral to our commitment to our employees. Our executive team and Board of Directors strongly support this commitment.

Facilities

Our corporate headquarters are currently located in Redwood City, California (the "Redwood City Lease"), where we lease 25,136 square feet of office, research and development and laboratory space. The Redwood City Lease will expire on April 30, 2022. On December 4, 2019, we entered into a lease agreement for approximately 98,000 square feet of office space to be constructed in San Carlos, California (the "San Carlos Lease"). These premises were delivered in November 2020, and we expect to move into this new headquarters in March 2022. The lease term will expire on October 31, 2031. Since commencement of the lease term, we have been responsible for

monthly base rent payments of $5.75 per rentable square foot. We provided a security deposit in the form of a letter of credit in the amount of $1.5 million. This lease agreement includes an option to extend the term for an additional period of five years and provides us a right of first refusal for certain additional office space. We believe that these facilities will be adequate for our near-term needs. If required, we believe that suitable additional or alternative space would be available in the future on commercially reasonable terms.

Legal Proceedings

For information on our legal proceedings, see Item 3, *Legal Proceedings*, in this Annual Report on Form 10-K.

Intellectual Property

Our success depends in part on our ability to obtain and maintain proprietary protection for our product candidates, technology and know-how, to operate without infringing the proprietary rights of others and to prevent others from infringing our proprietary rights. Our policy is to seek to protect our proprietary position by, among other methods, pursuing and obtaining patent protection in the United States and in jurisdictions outside of the United States related to our proprietary technology, inventions, improvements and product candidates that are important to the development and implementation of our business. Our patent portfolio is intended to cover our product candidates and components thereof, their methods of use and processes for their manufacture, our proprietary reagents and assays and any other inventions that are commercially important to our business. We also rely on trade secret protection of our confidential information and know-how relating to our proprietary technology, platforms and product candidates.

We believe that we have substantial know-how and trade secrets relating to our technology and product candidates. Our patent portfolio as of February 15, 2022 contains eight issued and unexpired U.S. patents and seven pending U.S. utility patent applications that are solely owned or exclusively licensed by us and numerous foreign counterparts of these patents and patent applications.

We have exclusively licensed from JHU four issued and unexpired U.S. patents and also foreign counterparts, with claims granted in Europe and Japan. The JHU licensed patent rights include issued U.S. patents with claims that recite anti-Siglec-8 antibodies comprising the CDRs of a particular antibody and methods of use a class of antibodies that bind to Siglec-8 for treating particular diseases. We own four granted U.S. patents that claim the active component of lirentelimab, an anti-Siglec-8 antibody, pharmaceutical compositions comprising lirentelimab, and methods for the treatment of particular diseases using antibodies to Siglec-8, with a projected expiration date in 2035 in the absence of patent extensions. Similar patents are issued in Europe, Japan and other territories. We have twelve further pending families of patent applications that include U.S. and foreign applications relating to methods of treatment for treating particular diseases using antibodies to Siglec-8, methods of delivering antibodies to Siglec-8, and formulations for antibodies to Siglec-8. We have also filed patent applications with claims pending relating to antibodies in preclinical development and methods for treating cancer with these antibodies. We also have a non-exclusive license to intellectual property from BioWa and Lonza regarding the expression and manufacturing of monoclonal antibodies in particular mammalian host cell lines.

The term of individual patents depends upon the legal term for patents in the countries in which they are granted. In most countries, including the United States, the patent term is generally 20 years from the earliest claimed filing date of a non-provisional patent application in the applicable country. In the United States, a patent's term may, in certain cases, be lengthened by patent term adjustment, which compensates a patentee for administrative delays by the U.S. Patent and Trademark Office in examining and granting a patent, or may be shortened if a patent is terminally disclaimed over a commonly owned patent or a patent naming a common inventor and having an earlier expiration date. The Hatch-Waxman Act permits a patent term extension of up to five years beyond the expiration date of a U.S. patent as partial compensation for the length of time the drug is under regulatory review while the patent is in force. A patent term extension cannot extend the remaining term of a patent beyond a total of 14 years from the date of product approval, only one patent applicable to each regulatory review period may be extended and only those claims covering the approved drug, a method for using it or a method for manufacturing it may be extended.

Similar provisions are available in the European Union and certain other foreign jurisdictions to extend the term of a patent that covers an approved drug. In the future, if and when our product candidates, including lirentelimab, receive approval by the FDA or foreign regulatory authorities, we expect to apply for patent term extensions on issued patents covering those products, depending upon the length of the clinical trials for each drug and other factors. Expiration dates referred to above are without regard to potential patent term extension or other market exclusivity that may be available to us.

We also rely, in some circumstances, on trade secrets to protect our technology. However, trade secrets can be difficult to protect. We seek to protect our proprietary technology and processes, in part, by confidentiality agreements with our employees, consultants, scientific advisors and contractors. We also seek to preserve the integrity and confidentiality of our data and trade secrets by maintaining physical security of our premises and physical and electronic security of our information technology systems.

Corporate Information

We were incorporated in Delaware in March 2012. Our website is www.allakos.com. We use our website as a channel of distribution for company information, and financial and other material information regarding our company is routinely posted and accessible on our website.

On the Investor Relations section of our website, we post or will post, as applicable, the following filings as soon as reasonably practicable after they are electronically filed with or furnished to the Securities and Exchange Commission (the "SEC"): our Annual Report on Form 10-K (the "Annual Report"), our Proxy Statement on Schedule 14A, our Quarterly Reports on Form 10-Q, our Current Reports on Form 8-K and any amendments to those reports filed or furnished pursuant to Section 13(a) or 15(d) of the Securities Exchange Act of 1934, as amended.

All of the information on our Investor Relations web page is available to be viewed free of charge. Information contained on our website is not part of this Annual Report or our other filings with the SEC. We assume no obligation to update or revise any forward-looking statements in this Annual Report whether as a result of new information, future events or otherwise, unless we are required to do so by law.

The SEC also maintains a website (www.sec.gov) that contains reports, proxy and information statements and other information regarding issuers that file electronically with the SEC.

Impact of COVID-19 on Our Business

The pandemic caused by an outbreak of a novel coronavirus causing a disease known as COVID-19 ("COVID-19") has resulted, and is likely to continue to result, in significant national and global economic disruption and may have an adverse impact on our operations, supply chains and distribution systems or those of our contractors, and increase our expenses, including as a result of impacts associated with preventive and precautionary measures that are being taken, such as restrictions on travel, quarantine polices and social distancing. For example, the ability of our employees or those of our contractors to work has been and is likely to continue to be adversely affected. Moreover, we and our contractors have and are likely to continue to experience disruptions in supply of items that are essential for our research and development activities, including, for example, raw materials and other consumables used in the manufacturing of our product candidates or medical and laboratory supplies used in our clinical trials or preclinical studies, in each case, for which there are or may be shortages because of ongoing efforts to address the outbreak. In particular, pursuant to the U.S. Defense Production Act, as amended (the "Defense Production Act"), the U.S. federal government can require domestic industries to provide essential goods and services needed for the national defense, and they have begun to use it in the context of COVID-19 to divert supplies and materials to vaccine producers, and this has and likely will continue to cause delays with some of our suppliers. In addition, enrollment for our clinical studies may be adversely affected and the completion of such studies may be delayed. Also, the spread of COVID-19 has disrupted the United States' healthcare and healthcare regulatory systems which could divert healthcare resources away from, or materially delay, FDA approval or any applicable foreign regulatory approval with respect to our product candidates. Furthermore, our clinical trials may be negatively affected by the COVID-19 outbreak. Given the daily evolution of the COVID-19 outbreak and the response to curb its spread, currently we are not able to estimate the effects of the COVID-19 outbreak to our results

of operations or financial condition. For additional information, see "Risk Factors–*Risks Related to the Discovery, Development and Commercialization of Our Product Candidates–Our business may be adversely affected by health epidemics, including the recent coronavirus outbreak*."

Item 1A. Risk Factors.

Investing in our common stock involves a high degree of risk. The following discussion of risk factors contains forward-looking statements. You should carefully consider the risks described below, as well as the other information in this Annual Report on Form 10-K, including our financial statements and the related notes and the section titled "Management's Discussion and Analysis of Financial Condition and Results of Operations." The occurrence of any of the events or developments described below could materially harm our business, financial condition, results of operations and growth prospects. In such an event, the market price of our common stock could decline, and you may lose all or part of your investment. Additional risks and uncertainties not presently known to us or that we currently deem immaterial also may impair our business, financial condition, results of operations and growth prospects.

Risk Factors Summary

Risks Related to Our Financial Position and Need for Additional Capital

- We are engaged in clinical drug development and have a limited operating history and no products approved for commercial sale, which may make it difficult for you to evaluate our current business and predict our future success and viability.
- We have incurred significant net losses since inception and we expect to continue to incur significant net losses for the foreseeable future.
- Our ability to generate revenue and achieve profitability depends significantly on our ability to achieve a number of objectives.

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

- Our business may be adversely affected by health epidemics, including the recent coronavirus outbreak.
- We are dependent on the success of our lead compound, lirentelimab, which is currently in multiple clinical trials, and if we are unable to obtain approval for and commercialize lirentelimab for one or more indications in a timely manner, our business could be materially harmed.
- If we experience delays or difficulties in the enrollment of patients in clinical trials, our receipt of necessary marketing approvals could be delayed or prevented.

Risks Related to Regulatory Approval and Other Legal Compliance Matters

- The regulatory approval processes of the FDA, European Medicines Agency ("EMA") and comparable foreign regulatory authorities are lengthy, time-consuming and inherently unpredictable, and if we are ultimately unable to obtain regulatory approval for our product candidates, we will be unable to generate product revenue and our business will be substantially harmed.
- We have no products approved for commercial sale and have not obtained marketing approvals, manufactured a commercial-scale product or conducted sales and marketing activities necessary for successful product commercialization. We may be unable to obtain U.S. or foreign regulatory approval and, as a result, unable to commercialize our product candidates.
- Our clinical trials may reveal significant adverse events, toxicities or other side effects and may result in a safety profile that could inhibit regulatory approval or market acceptance of any of our product candidates.

Risks Related to Employee Matters, Managing Our Growth and Other Risks Related to Our Business

- Our success is highly dependent on the services of our Chief Executive Officer, Dr. Robert Alexander, and our President and Chief Operating Officer, Dr. Adam Tomasi, and our ability to attract and retain highly skilled executive officers and employees.
- If we are unable to establish sales or marketing capabilities or enter into agreements with third-parties to sell or market our product candidates, we may not be able to successfully sell or market our product candidates that obtain regulatory approval.
- In order to successfully implement our plans and strategies, we will need to grow the size of our organization, and we may experience difficulties in managing this growth.

Risks Related to Intellectual Property

- If we are unable to obtain or protect intellectual property rights, we may not be able to compete effectively in our market.
- We may not be able to protect our intellectual property rights throughout the world.
- Changes in patent law could diminish the value of patents in general, thereby impairing our ability to protect our product candidates.

Risks Related to Our Dependence on Third-Parties

- We rely on third-parties to conduct our clinical trials and those third-parties may not perform satisfactorily, including failing to meet deadlines for the completion of such trials, research and studies.
- We contract with third-parties for the production of our product candidates for preclinical studies and, in the case of lirentelimab, our ongoing clinical trials, and expect to continue to do so for additional clinical trials and ultimately for commercialization, and this reliance on third-parties increases the risk that we will not have sufficient quantities of our product candidates or drugs or such quantities at an acceptable cost, which could delay, prevent or impair our development or commercialization efforts.
- We may not gain the efficiencies we expect from further scale-up of manufacturing of lirentelimab, and our third-party manufacturers may be unable to successfully scale-up manufacturing in sufficient quality and quantity for lirentelimab or our other product candidates, which could delay or prevent the conducting of our clinical trials or the development or commercialization of our other product candidates.

Risks Related to Ownership of Our Common Stock

- The market price of our stock may continue to be volatile, which could result in substantial losses for investors.
- Our operating results may fluctuate significantly, which makes our future operating results difficult to predict and could cause our operating results to fall below expectations or our guidance.

General Business Risks

- If we fail to comply with environmental, health and safety laws and regulations, we could become subject to fines or penalties or incur costs that could have a material adverse effect on our business.
- Our business activities may be subject to the Foreign Corrupt Practices Act (“FCPA”), the UK Bribery Act 2010 (“UK Bribery Act”), and other similar anti-bribery and anti-corruption laws of other countries in which we operate.
- We may experience disruptions and delays or incur financial damages as a result of system failures or security breaches.
- The other factors discussed under “Risk Factors”.

Risks Related to Our Financial Position and Need for Additional Capital

We are engaged in clinical drug development and have a limited operating history and no products approved for commercial sale, which may make it difficult for you to evaluate our current business and predict our future success and viability.

We are a clinical stage biopharmaceutical company with a limited operating history. We were incorporated and commenced operations in 2012, have no products approved for commercial sale and have not generated any revenue. Our operations to date have been limited to organizing and staffing our company, business planning, raising capital, identifying and developing potential product candidates, conducting preclinical and clinical studies of our product candidates, including Phase 1 and Phase 2 clinical trials of lirentelimab, our lead compound. All of our product candidates currently under development, other than lirentelimab, are in preclinical development. We have not yet demonstrated our ability to successfully complete any pivotal clinical trials, obtain marketing approvals, complete large-scale drug manufacturing or arrange for a third-party to do so on our behalf or conduct sales and marketing activities. For example, in December 2021, we announced that both our ENIGMA study and our KRYPTOS study failed to meet their patient-reported symptomatic co-primary endpoints. As a result, it may be more difficult for you to accurately predict our future success or viability than it could be if we had a longer operating history.

In addition, as a business with a limited operating history, we may encounter unforeseen expenses, difficulties, complications, delays and other known and unknown factors and risks frequently experienced by clinical stage biopharmaceutical companies in rapidly evolving fields. We also may need to transition from a company with a research focus to a company capable of supporting commercial activities. We have not yet demonstrated an ability to successfully overcome such risks and difficulties, or to make such a transition. If we do not adequately address these risks and difficulties or successfully make such a transition, our business will suffer.

We have incurred significant net losses since inception and we expect to continue to incur significant net losses for the foreseeable future.

We have incurred net losses in each reporting period since our inception, have not generated any revenue to date and have financed our operations principally through the sale and issuance of common stock and preferred stock. Our net losses were $269.9 million, $153.5 million and $85.4 million for the years ended December 31, 2021, 2020 and 2019, respectively. As of December 31, 2021, we had an accumulated deficit of $612.8 million. We have devoted substantially all of our resources and efforts to research and development. Our lead compound, lirentelimab, is in clinical development, and our other product candidates are in preclinical development. As a result, we expect that it will be several years, if ever, before we generate revenue from product sales. Even if we succeed in receiving marketing approval for and commercializing one or more of our product candidates, we expect that we will continue to incur substantial research and development and other expenses in order to develop and market additional potential products.

We expect to continue to incur significant expenses and increasing operating losses for the foreseeable future. The net losses we incur may fluctuate significantly from quarter-to-quarter such that a period-to-period comparison of our results of operations may not be a good indication of our future performance. The size of our future net losses will depend, in part, on the rate of future growth of our expenses and our ability to generate revenue. Our prior losses and expected future losses have had and will continue to have an adverse effect on our working capital and our ability to achieve and maintain profitability.

Our ability to generate revenue and achieve profitability depends significantly on our ability to achieve a number of objectives.

Our business depends entirely on the successful development and commercialization of our product candidates. Our ability to develop lirentelimab and any other product candidates remains uncertain. For example, in December 2021, we announced that both our ENIGMA study and our KRYPTOS study failed to meet their patient-reported symptomatic co-primary endpoints. We currently generate no revenues from sales of any products. We have no products approved for commercial sale and do not anticipate generating any revenue from product sales until sometime after we have successfully completed clinical development and received marketing approval for the commercial sale

of a product candidate, if ever. Our ability to generate revenue and achieve profitability depends significantly on our ability to achieve a number of objectives, including:

- successful and timely completion of preclinical and clinical development of our lead compound, lirentelimab, and any other future product candidates;
- timely receipt of marketing approvals for lirentelimab and any future product candidates for which we successfully complete clinical development and clinical trials from applicable regulatory authorities;
- the extent of any required post-marketing approval commitments to applicable regulatory authorities;
- developing an efficient and scalable manufacturing process for lirentelimab and any future product candidates, including establishing and maintaining commercially viable supply and manufacturing relationships with third-parties to obtain finished products that are appropriately packaged for sale;
- successful launch of commercial sales following any marketing approval, including the development of a commercial infrastructure, whether in-house or with one or more collaborators;
- a continued acceptable safety profile following any marketing approval;
- commercial acceptance of lirentelimab and any future product candidates as viable treatment options by patients, the medical community and third-party payors;
- addressing any competing technological and market developments;
- identifying, assessing, acquiring and developing new product candidates;
- obtaining and maintaining patent protection, trade secret protection and regulatory exclusivity, both in the United States and internationally;
- protection of our rights in our intellectual property portfolio, including our licensed intellectual property;
- negotiating favorable terms in any collaboration, licensing or other arrangements that may be necessary to develop, manufacture or commercialize our product candidates; and
- attracting, hiring and retaining qualified personnel.

We may never be successful in achieving our objectives and, even if we do, may never generate revenue that is significant or large enough to achieve profitability. If we do achieve profitability, we may not be able to sustain or increase profitability on a quarterly or annual basis. Our failure to become and remain profitable would decrease the value of our company and could impair our ability to maintain or further our research and development efforts, raise additional necessary capital, grow our business and/or continue our operations.

We will require substantial additional capital to finance our operations. If we are unable to raise such capital when needed, or on acceptable terms, we may be forced to delay, reduce and/or eliminate one or more of our research and drug development programs or future commercialization efforts.

Developing pharmaceutical products, including conducting preclinical studies and clinical trials, is a very time-consuming, expensive and uncertain process that takes years to complete. We expect our expenses to increase in connection with our ongoing activities, particularly as we conduct clinical trials of, and seek marketing approval for, lirentelimab and our other product candidates. In addition, if we obtain marketing approval for any of our product candidates, we expect to incur significant commercialization expenses related to drug sales, marketing, manufacturing and distribution. We have also incurred and expect to continue to incur additional costs associated with operating as a public company. Accordingly, we will need to obtain substantial additional funding in order to maintain our continuing operations. If we are unable to raise capital when needed or on acceptable terms, we may be forced to delay, reduce and/or eliminate one or more of our research and drug development programs or future commercialization efforts.

As of December 31, 2021, we had $424.2 million in cash, cash equivalents and investments in marketable securities, which includes proceeds from our July 2018 initial public offering and concurrent private placement that we completed on July 23, 2018 and from our subsequent follow-on offerings in August 2019 and November 2020, after deducting underwriting discounts and commissions. We believe that our existing cash, cash equivalents and

investments in marketable securities will enable us to fund our operating expenses and capital expenditure requirements through at least the next 12 months. Our estimate as to how long we expect our existing cash, cash equivalents and investments in marketable securities to continue to fund our operations is based on assumptions that may prove to be wrong, and we could use our available capital resources sooner than we currently expect. Changing circumstances, some of which may be beyond our control, could cause us to consume capital significantly faster than we currently anticipate, and we may need to seek additional funds sooner than planned.

We plan to use our existing cash, cash equivalents and investments in marketable securities to fund our development of lirentelimab and for other research and development activities, working capital and other general corporate purposes. This may include additional research, hiring additional personnel, capital expenditures and the costs of operating as a public company. Advancing the development of lirentelimab and any other product candidates will require a significant amount of capital. Our existing cash, cash equivalents and investments in marketable securities will not be sufficient to fund all of the actions that are necessary to complete the development of lirentelimab or any of our other product candidates. We will be required to obtain further funding through public or private equity offerings, debt financings, collaborations and licensing arrangements or other sources, which may dilute our stockholders or restrict our operating activities. We do not have any committed external source of funds. Adequate additional financing may not be available to us on acceptable terms, or at all. Our failure to raise capital as and when needed would have a negative impact on our financial condition and our ability to pursue our business strategy.

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

Our business may be adversely affected by health epidemics, including the recent coronavirus outbreak.

In December 2019, an outbreak of a novel coronavirus causing a disease known as COVID-19 ("COVID-19") originated and spread to a number of countries, including the U.S. On March 11, 2020, the World Health Organization characterized COVID-19 as a pandemic.

COVID-19 may have an adverse impact on our operations, supply chains and distribution systems or those of our contractors, and increase our expenses, including as a result of impacts associated with preventive and precautionary measures that are being taken, such as restrictions on travel, quarantine polices and social distancing. For example, the ability of our employees or those of our contractors to work has been and is likely to continue to be adversely affected. Moreover, we and our contractors have experienced and are likely to continue to experience disruptions in supply of items that are essential for our research and development activities, including, for example, raw materials and other consumables used in the manufacturing of our product candidates or medical and laboratory supplies used in our clinical trials or preclinical studies, in each case, for which there are or may be shortages because of ongoing efforts to address the outbreak. In particular, pursuant to the U.S. Defense Production Act, as amended (the "Defense Production Act"), the U.S. federal government may, among other things, require domestic industries to provide essential goods and services needed for the national defense, and they have begun to use the Defense Production Act in the context of COVID-19 to divert supplies and materials to vaccine producers. For example, one of our suppliers has informed us that, due to their obligation to prioritize other products or customers pursuant to the Defense Production Act, they are currently not able to fulfill our orders for certain materials previously ordered to be used in our manufacturing process. While this and similar delays in materials have not yet caused delays in our overall timeline for clinical trials or regulatory filings, it is quite possible that this or other such delays may occur in the future, whether as a result of actions taken pursuant to the Defense Production Act or general shortages of materials attributable to the global efforts to combat Covid-19, which could impact our proposed timeline for developing and commercializing lirentelimab and adversely impact our business, financial condition and results of operations.

In addition, the spread of COVID-19 has disrupted the United States' healthcare and healthcare regulatory systems which could divert healthcare resources away from, or materially delay, U.S. Food and Drug Administration ("FDA") approval or any applicable foreign regulatory approval with respect to our product candidates. Furthermore, our clinical trials may be negatively affected by the COVID-19 outbreak. Site initiation and patient enrollment may be delayed, for example, due to factors including prioritization of hospital resources toward the COVID-19 outbreak, travel restrictions, the inability to access sites for initiation and monitoring, and difficulties recruiting or retaining patients in our ongoing and planned clinical trials. Furthermore, if we determine that our clinical trial participants may suffer from exposure to COVID-19 as a result of their participation in our clinical studies, we may voluntarily terminate certain clinical sites as a safety measure until we reasonably believe that the likelihood of exposure has

subsided. We may therefore be unable to complete our clinical trials on the timelines we expect, if at all, which could materially and adversely impact our ability to seek regulatory approval for our product candidates. COVID-19 may also reduce the effectiveness of our future sales efforts and/or impact our ability to launch and commercialize such product candidates; we have no experience in launching or selling a product amid pandemic conditions. COVID-19 also may have an adverse impact on the economies and financial markets of many countries, including the United States, potentially resulting in an economic downturn that could affect demand for our product candidates, if approved, impair our ability to raise capital when needed or otherwise impact our business, results of operations, cash flows and financial condition. In addition, if the spread of COVID-19 continues and our operations are impacted, we risk a delay, default and/or nonperformance under our existing agreements arising from force majeure. Any of the foregoing could harm our business and we cannot anticipate all of the ways in which health epidemics such as COVID-19 could adversely impact our business. Although we are continuing to monitor and assess the effects of the COVID-19 pandemic on our business, the ultimate impact of the COVID-19 outbreak or a similar health epidemic is highly uncertain and subject to change.

We are dependent on the success of our lead compound, lirentelimab, which is currently in multiple clinical trials. If we are unable to obtain approval for and commercialize lirentelimab for one or more indications in a timely manner, our business could be materially harmed.

Our future success is dependent on our ability to timely complete clinical trials and obtain marketing approval for, and then successfully commercialize lirentelimab, our lead compound, for one or more indications. Lirentelimab is in the clinical stages of development and we are investing the majority of our efforts and financial resources in the research and development of lirentelimab for multiple indications. Our ability to develop lirentelimab remains uncertain. For example, in December 2021, we announced that both our ENIGMA study and our KRYPTOS study failed to meet their patient-reported symptomatic co-primary endpoints. Lirentelimab will require additional clinical development, evaluation of clinical, preclinical and manufacturing activities, marketing approval from government regulators, substantial investment and significant marketing efforts before we generate any revenues from product sales. In addition, some of our future development plans for lirentelimab may be based on a post-hoc analysis of our ENIGMA and KRYPTOS trials. Post-hoc analyses are potentially unreliable, and are not, in and of themselves, the basis for approval of lirentelimab. We are not permitted to market or promote lirentelimab, or any other product candidates, before we receive marketing approval from the FDA and comparable foreign regulatory authorities, and we may never receive such marketing approvals.

The success of lirentelimab will depend on several factors, including the following:

- initiation and timely completion of our clinical trials of lirentelimab;
- successful and timely enrollment of appropriate patients for the indication(s) included in our current and future clinical trials;
- potential variability of patient-reported measures and outcomes;
- our ability to address any potential delays resulting from factors related to the COVID-19 pandemic;
- obtaining positive data that support demonstration of efficacy, safety and tolerability profiles and durability of effect for our product candidates that are satisfactory to the FDA or any comparable foreign regulatory authority for marketing approval;
- timely receipt of marketing approvals for lirentelimab from applicable regulatory authorities;
- the extent of any required post-marketing approval commitments to applicable regulatory authorities;
- the maintenance of existing or the establishment of new supply arrangements with third-party drug product suppliers and manufacturers for clinical development and, if approved, commercialization of our product candidates;
- the maintenance of existing or the establishment of new scaled production arrangements with third-party manufacturers to obtain finished products that are appropriately packaged for sale;
- obtaining and maintaining patent protection, trade secret protection and regulatory exclusivity, both in the United States and internationally;

- protection of our rights in our intellectual property portfolio, including our licensed intellectual property;
- establishing sales, marketing and distribution capabilities and the successful launch of commercial sales of our product candidates if and when approved for marketing, whether alone or in collaboration with others;
- a continued acceptable safety profile following any marketing approval;
- commercial acceptance by patients, the medical community and third-party payors; and
- our ability to compete with other therapies.

We do not have complete control over many of these factors, including certain aspects of clinical development and the regulatory submission process, potential threats to our intellectual property rights and the manufacturing, marketing, distribution and sales efforts of any future collaborator. If we are not successful with respect to one or more of these factors in a timely manner or at all, we could experience significant delays or an inability to successfully commercialize any product candidates from our lead programs, which would materially harm our business. If we do not receive marketing approvals for such product candidates, we may not be able to continue our operations.

If we experience delays or difficulties in the enrollment of patients in clinical trials, our receipt of necessary marketing approvals could be delayed or prevented.

We may not be able to initiate or continue clinical trials for our product candidates if we are unable to locate and enroll a sufficient number of eligible patients to participate in these trials as required by the FDA or comparable foreign regulatory authorities. Patient enrollment is a significant factor in the timing of clinical trials. In particular, our ability to enroll eligible patients may be limited or may result in slower enrollment than we anticipate.

Patient enrollment may be affected if our competitors have ongoing clinical trials for product candidates that are under development for the same indications as our product candidates, and patients who would otherwise be eligible for our clinical trials instead enroll in clinical trials of our competitors' product candidates. Patient enrollment may also be affected by other factors, including:

- travel and other restrictions due to pandemics such as COVID-19;
- size and nature of the patient population;
- severity of the disease under investigation;
- availability and efficacy of approved drugs for the disease under investigation;
- patient eligibility criteria for the trial in question;
- perceived risks and benefits of the product candidate under study;
- efforts to facilitate timely enrollment in clinical trials;
- patient referral practices of physicians;
- the ability to monitor patients adequately during and after treatment;
- proximity and availability of clinical trial sites for prospective patients; and
- continued enrollment of prospective patients by clinical trial sites.

Our inability to enroll a sufficient number of patients for our clinical trials would result in significant delays or may require us to abandon one or more clinical trials altogether. The COVID-19 global pandemic has created uncertainties in the expected timelines for clinical stage biotechnology companies such as us, and because of such uncertainties, it is extremely difficult for us to accurately predict at this time if we can continue to enroll patients and when we can complete our Phase 3 clinical trial. Enrollment delays in our clinical trials may result in increased development costs for our product candidates and jeopardize our ability to obtain marketing approval for the sale of our product candidates.

The clinical trials of our product candidates may not adequately demonstrate safety and efficacy to the satisfaction of regulatory authorities or otherwise produce positive results, which would prevent or delay development, regulatory approval and commercialization.

Before obtaining marketing approval from regulatory authorities for the sale of our product candidates, we must complete preclinical development and then conduct extensive clinical trials to demonstrate the safety and efficacy of our product candidates in each target indication. Clinical testing is expensive, difficult to design and implement, can take many years to complete and its ultimate outcome is uncertain. A failure of one or more clinical trials can occur at any stage of the process. The outcome of preclinical studies and early-stage clinical trials may not be predictive of the success of later clinical trials. Moreover, preclinical and clinical data are often susceptible to varying interpretations and analyses, and many companies that have believed their product candidates performed satisfactorily in preclinical studies and clinical trials have nonetheless failed to obtain marketing approval of their drugs. Our product candidates are in an early stage of development, and there is a high risk of failure and we may never succeed in developing marketable products

We do not know whether our future clinical trials will begin on time or enroll patients on time, or whether our ongoing and/or future clinical trials will be completed on schedule or at all. Clinical trials can be delayed for a variety of reasons, including delays related to:

- obtaining approval to commence a trial;
- reaching agreement on acceptable terms with prospective CROs and clinical trial sites;
- obtaining institutional review board approval at each clinical trial site;
- recruiting suitable patients to participate in a trial;
- patients failing to comply with trial protocol or dropping out of a trial;
- clinical trial sites deviating from trial protocol or dropping out of a trial;
- the need to add new clinical trial sites; or
- manufacturing sufficient quantities of product candidate for use in clinical trials.

We may experience numerous unforeseen events during, or as a result of, clinical trials that could delay or prevent receipt of marketing approval or our ability to commercialize our product candidates, including:

- receipt of feedback from regulatory authorities that requires us to modify the design of our clinical trials;
- successful and timely enrollment of appropriate patients for the indication(s) included in our current and future clinical trials;
- potential variability of patient-reported measures and outcomes;
- negative or inconclusive clinical trial results that may require us to conduct additional clinical trials or abandon certain drug development programs;
- the number of patients required for clinical trials being larger than anticipated, enrollment in these clinical trials being slower than anticipated or participants dropping out of these clinical trials at a higher rate than anticipated;
- third-party contractors failing to comply with regulatory requirements or meet their contractual obligations to us in a timely manner, or at all;
- the suspension or termination of our clinical trials for various reasons, including non-compliance with regulatory requirements, a finding that our product candidates have undesirable side effects or other unexpected characteristics or risks;
- the cost of clinical trials of our product candidates being greater than anticipated;
- the supply or quality of our product candidates or other materials necessary to conduct clinical trials of our product candidates being insufficient or inadequate; and

- regulators revising the requirements for approving our product candidates.

If any of these events occur, we may incur unplanned costs, be delayed in obtaining marketing approval, if at all, receive more limited or restrictive marketing approval, be subject to additional post-marketing testing requirements or have the drug removed from the market after obtaining marketing approval.

The outcome of preclinical testing and early clinical trials may not be predictive of the success of later clinical trials, and the results of our clinical trials may not satisfy the requirements of the FDA or comparable foreign regulatory authorities.

We currently have no drugs approved for sale and we cannot guarantee that we will ever have marketable drugs. Clinical failure can occur at any stage of clinical development. Clinical trials may produce negative or inconclusive results, and we or any future collaborators may decide, or regulators may require us, to conduct additional clinical trials or preclinical studies. We will be required to demonstrate with substantial evidence through well-controlled clinical trials that our product candidates are safe and effective for use in a diverse population before we can seek marketing approvals for their commercial sale. Success in preclinical studies and early-stage clinical trials does not mean that future larger registration clinical trials will be successful. This is because product candidates in later-stage clinical trials may fail to demonstrate sufficient safety and efficacy to the satisfaction of the FDA and non-U.S. regulatory authorities despite having progressed through preclinical studies and early-stage clinical trials. In particular, no compound with the mechanism of action of lirentelimab has been commercialized, and the outcome of preclinical studies and early-stage clinical trials may not be predictive of the success of later-stage clinical trials.

From time to time, we may publish or report interim or preliminary data from our clinical trials. Interim or preliminary data from clinical trials that we may conduct may not be indicative of the final results of the trial and are subject to the risk that one or more of the clinical outcomes may materially change as patient enrollment continues and more patient data become available. Interim or preliminary data also remain subject to audit and verification procedures that may result in the final data being materially different from the interim or preliminary data. As a result, interim or preliminary data should be viewed with caution until the final data are available.

In some instances, there can be significant variability in safety and efficacy results between different clinical trials of the same product candidate due to numerous factors, including changes in trial protocols, differences in size and type of the patient populations, differences in and adherence to the dosing regimen and other trial protocols and the rate of dropout among clinical trial participants. In addition, we use patient-reported outcome assessments in our clinical trials, which involve patients' subjective assessments of efficacy of the treatments they receive in the trial. Such assessments can vary widely from day to day for a particular patient, and from patient to patient and site to site within a clinical trial. This subjectivity can increase the uncertainty of, and adversely impact, our clinical trial outcomes.

We do not know whether any clinical trials we may conduct will demonstrate consistent or adequate efficacy and safety sufficient to obtain marketing approval to market our product candidates.

Our product candidates may not achieve adequate market acceptance among physicians, hospitals, patients, healthcare payors and others in the medical community necessary for commercial success.

Even if our product candidates receive regulatory approval, they may not gain adequate market acceptance among physicians, hospitals, patients, healthcare payors and others in the medical community. The degree of market acceptance of any of our approved product candidates will depend on a number of factors, including:

- the efficacy and safety profile as demonstrated in planned clinical trials;
- the timing of market introduction of the product candidate as well as competitive products;
- the clinical indications for which the product candidate is approved;
- restrictions on the use of our products, if approved, such as boxed warnings or contraindications in labeling, or a Risk Evaluation and Mitigation Strategy ("REMS"), if any, which may not be required of alternative treatments and competitor products;

- the potential and perceived advantages of product candidates over alternative treatments;
- the cost of treatment in relation to alternative treatments;
- the availability of coverage and adequate reimbursement and pricing by third-parties and government authorities;
- relative convenience and ease of administration;
- the effectiveness of sales and marketing efforts;
- unfavorable publicity relating to the product candidate; and
- the approval of other new therapies for the same indications.

If any product candidate is approved but does not achieve an adequate level of acceptance by physicians, hospitals, healthcare payors and patients, we may not generate or derive sufficient revenue from that product candidate and our financial results could be harmed. Lirentelimab was administered intravenously in our lead Phase 3 and Phase 2/3 studies and we additionally plan to administer lirentelimab subcutaneously in future studies. Intravenous and subcutaneous drugs are less convenient for patients than some other methods of administration, such as an orally delivered drug.

The sizes of the patient populations suffering from some of the diseases we are targeting are small and based on estimates that may not be accurate.

Our projections of both the number of people who have some of the diseases we are targeting, as well as the subset of people with these diseases who have the potential to benefit from treatment with lirentelimab and any other future product candidates, are estimates. These estimates have been derived from a variety of sources, including scientific literature, surveys of clinics, physician interviews, patient foundations and market research, and may prove to be incorrect. Further, new studies may change the estimated incidence or prevalence of these diseases. The number of patients may turn out to be lower than expected. Additionally, the potentially addressable patient population for lirentelimab and any other future product candidates may be limited or may not be amenable to treatment with lirentelimab and any other products, if and when approved. Even if we obtain significant market share for lirentelimab and any other products (if and when they are approved), small potential target populations for certain indications means we may never achieve profitability without obtaining market approval for additional indications.

Our business will be impacted by our ability to advance additional product candidates beyond lirentelimab into clinical development and through to regulatory approval and commercialization. Our other product candidates are at even earlier stages of development than lirentelimab and may fail in development or suffer delays that adversely affect their commercial viability.

Our other product candidates are in the early stages of development and may fail in development or suffer delays that adversely affect their commercial viability. A product candidate can unexpectedly fail at any stage of preclinical and clinical development. The historical failure rate for product candidates is high due to risks relating to safety, efficacy, clinical execution, changing standards of medical care and other unpredictable variables. The results from preclinical testing or early clinical trials of a product candidate may not be predictive of the results that will be obtained in later-stage clinical trials of the product candidate.

Our future operating results are dependent on our ability to successfully develop, obtain regulatory approval for, and then successfully commercialize other product candidates in addition to lirentelimab. The success of any product candidates we may develop will depend on many factors, including, among other things, the following:

- generating sufficient data to support the initiation or continuation of clinical trials;
- obtaining regulatory permission to initiate clinical trials;
- contracting with the necessary parties to conduct clinical trials;
- successful enrollment of patients in, and the completion of, clinical trials;
- the timely manufacture of sufficient quantities of the product candidate for use in clinical trials; and

- adverse events in the clinical trials.

Even if we successfully advance any other product candidates into clinical development, their success will be subject to all of the clinical, regulatory and commercial risks described elsewhere in this "Risk Factors" section. Accordingly, we cannot assure you that we will ever be able to develop, obtain regulatory approval of, commercialize or generate significant revenue from any other product candidates.

Any drugs we develop may become subject to unfavorable third-party reimbursement practices and pricing regulations.

The availability and extent of coverage and adequate reimbursement by governmental and private payors is essential for most patients to be able to afford expensive treatments. Sales of any of our product candidates that receive marketing approval will depend substantially, both in the United States and internationally, on the extent to which the costs of our product candidates will be paid by health maintenance, managed care, pharmacy benefit, and similar healthcare management organizations or reimbursed by government health administration authorities, private health coverage insurers and other third-party payors. If reimbursement is not available, or is available only to limited levels, we may not be able to successfully commercialize our product candidates. Even if coverage is provided, the approved reimbursement amount may not be high enough to allow us to establish or maintain pricing sufficient to realize an adequate return on our investment. Coverage and reimbursement may impact the demand for, or the price of, any product candidate for which we obtain marketing approval. If coverage and reimbursement are not available or reimbursement is available only to limited levels, we may not successfully commercialize any product candidate for which we obtain marketing approval.

There is significant uncertainty related to insurance coverage and reimbursement of newly approved products. In the United States, principal decisions about reimbursement for new products are typically made by the Centers for Medicare & Medicaid Services ("CMS"), an agency within the U.S. Department of Health and Human Services. CMS decides whether and to what extent a new product will be covered and reimbursed under Medicare, and private payors often follow CMS's decisions regarding coverage and reimbursement to a substantial degree. However, one payor's determination to provide coverage for a drug product does not assure that other payors will also provide coverage for the drug product. As a result, the coverage determination process is often time-consuming and costly. This process will require us to provide scientific and clinical support for the use of our products to each payor separately, with no assurance that coverage and adequate reimbursement will be applied consistently or obtained in the first instance.

Increasingly, third-party payors are requiring that drug companies provide them with predetermined discounts from list prices and are challenging the prices charged for medical products. Further, such payors are increasingly challenging the price, examining the medical necessity and reviewing the cost effectiveness of medical drug products. There may be especially significant delays in obtaining coverage and reimbursement for newly approved drugs. Third-party payors may limit coverage to specific drug products on an approved list, known as a formulary, which might not include all FDA-approved drugs for a particular indication. We may need to conduct expensive pharmaco-economic studies to demonstrate the medical necessity and cost effectiveness of our products. Nonetheless, our product candidates may not be considered medically necessary or cost effective. We cannot be sure that coverage and reimbursement will be available for any product that we commercialize and, if reimbursement is available, what the level of reimbursement will be.

Outside the United States, international operations are generally subject to extensive governmental price controls and other market regulations, and we believe the increasing emphasis on cost containment initiatives in Europe, Canada and other countries has and will continue to put pressure on the pricing and usage of therapeutics such as our product candidates. In many countries, particularly the countries of the European Union, medical product prices are subject to varying price control mechanisms as part of national health systems. In these countries, pricing negotiations with governmental authorities can take considerable time after a product receives marketing approval. To obtain reimbursement or pricing approval in some countries, we may be required to conduct a clinical trial that compares the cost-effectiveness of our product candidate to other available therapies. In general, product prices under such systems are substantially lower than in the United States. Other countries allow companies to fix their own prices for products but monitor and control company profits. Additional foreign price controls or other changes in pricing regulation could restrict the amount that we are able to charge for our product candidates. Accordingly, in markets

outside the United States, the reimbursement for our products may be reduced compared with the United States and may be insufficient to generate commercially reasonable revenue and profits.

If we are unable to establish or sustain coverage and adequate reimbursement for any future product candidates from third-party payors, the adoption of those products and sales revenue will be adversely affected, which, in turn, could adversely affect the ability to market or sell those product candidates, if approved. Coverage policies and third-party reimbursement rates may change at any time. Even if favorable coverage and reimbursement status is attained for one or more products for which we receive regulatory approval, less favorable coverage policies and reimbursement rates may be implemented in the future.

If our competitors develop and market products that are more effective, safer or less expensive than our product candidates, our commercial opportunities will be negatively impacted.

The biotechnology industry is highly competitive and subject to rapid and significant technological change. Products we may develop in the future are likely to face competition from other drugs and therapies, some of which we may not currently be aware. In addition, our products may need to compete with off-label drugs used by physicians to treat the indications for which we seek approval. This may make it difficult for us to replace existing therapies with our products.

We are not aware of any other company or organization that is conducting clinical trials of a product candidate that targets both eosinophils and mast cells, including any product candidate that specifically targets Siglec-8. The competition we may face with respect to the indications we are targeting with lirentelimab includes, without limitation, Regeneron, AstraZeneca, Bristol Meyers Squibb, Shire, and Dr. Falk Pharma for EGIDs, Blueprint Medicines for ISM, Roche, Novartis, Regeneron, Celldex and Gossamer Bio for CU and Aldeyra for SAC. In addition, we are currently evaluating a host of other indications, and if we were to initiate trials in any such indication, we would likely face significant competition from a number of additional competitors. These companies, or other major multinational pharmaceutical and biotechnology companies, emerging and start-up companies, universities and other research institutions, could focus their future efforts on developing competing therapies and treatments for any of the indications we are currently targeting or may target in the future. Many of these current and potential competitors have significantly greater financial, manufacturing, marketing, drug development, technical and human resources and commercial expertise than we do. Large pharmaceutical and biotechnology companies, in particular, have extensive experience in clinical testing, obtaining regulatory approvals, recruiting patients and manufacturing biotechnology products. These companies also have significantly greater research and marketing capabilities than we do and may also have products that have been approved or are in late stages of development, and collaborative arrangements in our target markets with leading companies and research institutions. Established pharmaceutical and biotechnology companies may also invest heavily to accelerate discovery and development of novel compounds or to in-license novel compounds that could make the product candidates that we develop obsolete. As a result of all of these factors, our competitors may succeed in obtaining approval from the FDA or foreign regulatory authorities or discovering, developing and commercializing products in our field before we do.

Smaller and other clinical stage companies may also prove to be significant competitors, particularly through collaborative arrangements with large and established companies. These companies compete with us in recruiting and retaining qualified scientific and management personnel, establishing clinical trial sites and patient registration for planned clinical trials, as well as in acquiring technologies complementary to, or necessary for, our programs. In addition, the biotechnology industry is characterized by rapid technological change. If we fail to stay at the forefront of technological change, we may be unable to compete effectively. Technological advances or products developed by our competitors may render our technologies or product candidates obsolete, less competitive or not economical.

We have limited resources and are currently focusing our efforts on developing lirentelimab for particular indications. As a result, we may fail to capitalize on other product candidates or indications that may ultimately have proven to be more profitable.

We are currently focusing our efforts on a small number of indications. As a result, we may forego or delay pursuit of opportunities for other indications or with other product candidates that may have greater commercial potential. Our resource allocation decisions may cause us to fail to capitalize on viable commercial drugs or profitable market opportunities. Our spending on current and future research and development activities for specific indications

may not yield any commercially viable drugs. If we do not accurately evaluate the commercial potential or target markets for a particular product candidate, we may relinquish valuable rights to that product candidate through collaboration, licensing or other strategic arrangements in cases in which it would have been more advantageous for us to retain sole development and commercialization rights to such product candidate.

Our business entails a significant risk of product liability and if we are unable to obtain sufficient insurance coverage such inability could have an adverse effect on our business and financial condition.

Our business exposes us to significant product liability risks inherent in the development, testing, manufacturing and marketing of therapeutic treatments. Product liability claims could delay or prevent completion of our development programs. If we succeed in marketing products, such claims could result in an FDA investigation of the safety and effectiveness of our products, our manufacturing processes and facilities or our marketing programs. FDA investigation could potentially lead to a recall of our products or more serious enforcement action, limitations on the approved indications for which they may be used or suspension or withdrawal of approvals. Regardless of the merits or eventual outcome, liability claims may also result in decreased demand for our products, injury to our reputation, costs to defend the related litigation, a diversion of management's time and our resources and substantial monetary awards to trial participants or patients. We currently have product liability insurance that we believe is appropriate for our stage of development and may need to obtain higher levels prior to marketing any of our product candidates, if approved. Any insurance we have or may obtain may not provide sufficient coverage against potential liabilities. Furthermore, clinical trial and product liability insurance is becoming increasingly expensive. As a result, we may be unable to obtain sufficient insurance at a reasonable cost to protect us against losses caused by product liability claims that could have an adverse effect on our business and financial condition.

Risks Related to Regulatory Approval and Other Legal Compliance Matters

The regulatory approval processes of the FDA, European Medicines Agency ("EMA") and comparable foreign regulatory authorities are lengthy, time-consuming and inherently unpredictable. If we are ultimately unable to obtain regulatory approval for our product candidates, we will be unable to generate product revenue and our business will be substantially harmed.

The time required to obtain approval by the FDA, EMA and comparable foreign regulatory authorities is unpredictable, typically takes many years following the commencement of clinical trials, and depends upon numerous factors, including the type, complexity and novelty of the product candidates involved. In addition, approval policies, regulations or the type and amount of clinical data necessary to gain approval may change during the course of a product candidate's clinical development and may vary among jurisdictions, which may cause delays in the approval or the decision not to approve an application. Regulatory authorities have substantial discretion in the approval process and may refuse to accept any application or may decide that our data are insufficient for approval and require additional preclinical, clinical or other data. Even if we eventually complete clinical testing and receive approval of any regulatory filing for our product candidates, the FDA, EMA and comparable foreign regulatory authorities may approve our product candidates for a more limited indication or a narrower patient population than we originally requested. We have not submitted for, or obtained regulatory approval for any product candidate, and it is possible that none of our existing product candidates or any product candidates we may seek to develop in the future will ever obtain regulatory approval.

Applications for our product candidates could fail to receive regulatory approval in an initial or subsequent indication for many reasons, including but not limited to the following:

- the FDA, EMA or comparable foreign regulatory authorities may disagree with the design, implementation or results of our clinical trials;
- the FDA, EMA or comparable foreign regulatory authorities may determine that our product candidates are not safe and effective, only moderately effective or have undesirable or unintended side effects, toxicities or other characteristics that preclude our obtaining marketing approval or prevent or limit commercial use;
- the population studied in the clinical program may not be sufficiently broad or representative to assure efficacy and safety in the full population for which we seek approval;

- the FDA, EMA or comparable foreign regulatory authorities may disagree with our interpretation of data from preclinical studies or clinical trials;
- the data collected from clinical trials of our product candidates may not be sufficient to support the submission of a Biologics License Application ("BLA") or New Drug Application ("NDA"), or other submission or to obtain regulatory approval in the United States or elsewhere;
- we may be unable to demonstrate to the FDA, EMA or comparable foreign regulatory authorities that a product candidate's risk-benefit ratio for its proposed indication is acceptable;
- the FDA, EMA or comparable foreign regulatory authorities may fail to approve the manufacturing processes, test procedures and specifications or facilities of third-party manufacturers with which we contract for clinical and commercial supplies; and
- the approval policies or regulations of the FDA, EMA or comparable foreign regulatory authorities may significantly change in a manner rendering our clinical data insufficient for approval.

Our development program is studying patients with eosinophilic gastritis ("EG") and/or eosinophilic duodenitis ("EoD"). Varied terminology had been used in the literature to describe mucosal eosinophilia in the stomach and duodenum (including eosinophilic gastritis, eosinophilic duodenitis, eosinophilic gastroenteritis and eosinophilic enteritis), and the nomenclature for grouping non-esophageal eosinophil gastrointestinal disorders ("EGIDs"), both within the medical industry and the relevant regulatory agencies, as well as the ultimate indication and label for lirentelimab, have yet to be finalized/agreed upon. For example, in a recent communication with the FDA, they commented that they believe further characterization of isolated EoD is needed to determine whether this condition is a subtype of EG or whether it should be considered a distinct indication. The FDA stated they were taking this position because the field of eosinophilic gastrointestinal diseases is advancing rapidly and that data from published literature, the academic community, and your development program would be informative. It is possible based on our communications that the FDA may determine EoD or any other subset of EGIDs are not separate disease processes. If the FDA determines that EoD is not a separate disease process, but the EoD population is included in the approval as a subset of an approved condition, then such a determination could cause confusion and adversely impact doctors' ability or willingness to prescribe our medication. In addition, if any particular subset of the EGID population falls outside the label, our marketing authorization would not extend to that population, which would impact the potential addressable market for our drug. Ultimately, whether lirentelimab will be used to treat any subset of EGID patients will depend on the agency's view of the efficacy and safety of lirentelimab, and our overall clinical development program.

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

We may be unable to obtain U.S. or foreign regulatory approval and, as a result, unable to commercialize our product candidates.

Our product candidates are subject to extensive governmental regulations relating to, among other things, research, testing, development, manufacturing, safety, efficacy, approval, recordkeeping, reporting, labeling, storage, packaging, advertising and promotion, pricing, marketing and distribution of drugs and therapeutic biologics. Rigorous preclinical testing and clinical trials and an extensive regulatory approval process must be successfully completed in the United States and in many foreign jurisdictions before a new drug or therapeutic biologic can be marketed. Satisfaction of these and other regulatory requirements is costly, time-consuming, uncertain and subject to unanticipated delays. For example, despite the recent completion of our Phase 2 clinical trial in patients with EG and/or EoD, significant regulatory hurdles remain, both near term and long term, before lirentelimab can obtain regulatory approval in the United States. There can be no assurance we will be able to successfully conclude these undertakings in a timely manner, and it is possible that none of the product candidates we may develop will obtain the regulatory approvals necessary for us to begin selling them.

Our company has not conducted or managed clinical trials through regulatory approval, including FDA approval. The time required to obtain FDA and other approvals is unpredictable but typically takes many years following the commencement of clinical trials, depending upon the type, complexity and novelty of the product

candidate. The standards that the FDA and its foreign counterparts use when regulating us require judgment and can change, which makes it difficult to predict with certainty how they will be applied. Any analysis we perform of data from preclinical and clinical activities is subject to confirmation and interpretation by regulatory authorities, which could delay, limit or prevent regulatory approval. We may also encounter unexpected delays or increased costs due to new government regulations or due to any delays in FDA regulatory review due to the COVID-19 outbreak. Examples of such regulations include future legislation or administrative action, or changes in FDA policy during the period of product development, clinical trials and FDA regulatory review. It is impossible to predict whether legislative changes will be enacted, or whether FDA or foreign regulations, guidance or interpretations will be changed, or what the impact of such changes, if any, may be.

Any delay or failure in obtaining required approvals could have a material and adverse effect on our ability to generate revenue from the particular product candidate for which we are seeking approval. Furthermore, any regulatory approval to market a product may be subject to limitations on the approved uses for which we may market the product or the labeling or other restrictions. In addition, the FDA has the authority to require a REMS as part of a BLA or NDA, or after approval, which may impose further requirements or restrictions on the distribution or use of an approved drug or biologic. These requirements or restrictions might include limiting prescribing to certain physicians or medical centers that have undergone specialized training, limiting treatment to patients who meet certain safe-use criteria and requiring treated patients to enroll in a registry. These limitations and restrictions may limit the size of the market for the product and affect reimbursement by third-party payors.

We are also subject to numerous foreign regulatory requirements governing, among other things, the conduct of clinical trials, manufacturing and marketing authorization, pricing and third-party reimbursement. The foreign regulatory approval process varies among countries and may include all of the risks associated with FDA approval described above as well as risks attributable to the satisfaction of local regulations in foreign jurisdictions. Moreover, the time required to obtain approval may differ from that required to obtain FDA approval. Approval by the FDA does not ensure approval by regulatory authorities outside the United States and vice versa.

Our clinical trials may reveal significant adverse events, toxicities or other side effects and may result in a safety profile that could inhibit regulatory approval or market acceptance of any of our product candidates.

In order to obtain marketing approval for any of our product candidates, we must demonstrate the safety and efficacy of the product candidate for the relevant clinical indication or indications through preclinical studies and clinical trials as well as additional supporting data. If our product candidates are associated with undesirable side effects in preclinical studies or clinical trials, or have unexpected characteristics, we may need to interrupt, delay or abandon their development or limit development to more narrow uses or subpopulations in which the undesirable side effects or other characteristics are less prevalent, less severe or more acceptable from a risk-benefit perspective.

We have conducted Phase 1 and Phase 2 clinical trials in healthy volunteers, as well as in patients with EG, EoD, CU, ISM and SAC. However, we do not know the predictive value of these trials for our future clinical trials, and we cannot guarantee that any positive results in preclinical studies or previous clinical trials will successfully translate to patients in our future clinical trials. It is not uncommon to observe results in clinical trials that are unexpected based on preclinical testing, and many product candidates fail in clinical trials despite promising preclinical results. Moreover, preclinical and clinical data are often susceptible to varying interpretations and analyses, and many companies that believed their product candidates performed satisfactorily in preclinical studies and clinical trials have nonetheless failed to obtain marketing approval for their products. Because Siglec-8 is only naturally expressed in humans and certain other primates, there is no standard animal toxicology model for anti-Siglec-8 therapies, and the acceptability of our preclinical safety data for lirentelimab depends on the continued acceptance by the FDA and EMA, and the acceptance by other regulatory authorities, of the use of our proprietary transgenic mice models for toxicology studies.

Lirentelimab has generally been well tolerated in our clinical trials. The most common adverse event has been the occurrence of mild to moderate infusion-related reactions (“IRRs”) (consisting of flushing, feeling of warmth, headache, nausea or dizziness) which occurred mostly, but not exclusively, during the first infusion. Temporal interruption of the lirentelimab infusion and minimal intervention generally resulted in prompt resolution of symptoms and ability to resume the infusion without further complications, although there have been instances when an IRR has resulted in a subject being discontinued from a trial. Subjects in our ongoing and planned clinical trials may in the

future suffer other significant adverse events or other side effects not observed in our preclinical studies or previous clinical trials. If clinical trials of our product candidates fail to demonstrate efficacy to the satisfaction of regulatory authorities or do not otherwise produce positive results, we may incur additional costs or experience delays in completing, or ultimately be unable to complete, development and commercialization of our product candidates.

If further significant adverse events or other side effects are observed in any of our current or future clinical trials, we may have difficulty recruiting patients to the clinical trials, patients may drop out of our trials, or we may be required to abandon the trials or our development efforts of that product candidate altogether. We, the FDA, the EMA, other applicable regulatory authorities or an institutional review board may suspend clinical trials of a product candidate at any time for various reasons, including a belief that subjects in such trials are being exposed to unacceptable health risks or adverse side effects. Some potential therapeutics developed in the biotechnology industry that initially showed therapeutic promise in early-stage studies have later been found to cause side effects that prevented their further development. Even if the side effects do not preclude the drug from obtaining or maintaining marketing approval, undesirable side effects may inhibit market acceptance of the approved product due to its tolerability relative to other therapies. Any of these developments could materially harm our business, financial condition and prospects.

Further, if any of our product candidates obtains marketing approval, toxicities associated with our product candidates may also develop after such approval and lead to a requirement to conduct additional clinical safety trials, additional warnings being added to the labeling, significant restrictions on the use of the product or the withdrawal of the product from the market. We cannot predict whether our product candidates will cause toxicities in humans that would preclude or lead to the revocation of regulatory approval based on preclinical studies or early-stage clinical testing.

The FDA, EMA and applicable foreign regulatory authorities may not accept data from trials conducted in locations outside of their jurisdiction.

We currently conduct clinical trials both in the United States and in other countries. We may in the future choose to conduct additional clinical trials in countries outside the United States, including in Europe. The acceptance of study data by the FDA, EMA or applicable foreign regulatory authority from clinical trials conducted outside of their respective jurisdictions may be subject to certain conditions. In cases where data from foreign clinical trials are intended to serve as the basis for marketing approval in the United States, the FDA will generally not approve the application on the basis of foreign data alone unless (i) the data are applicable to the United States population and United States medical practice and (ii) the trials are performed by clinical investigators of recognized competence and pursuant to current good clinical practices regulations. Additionally, the FDA's clinical trial requirements, including sufficient size of patient populations and statistical powering, must be met. Many foreign regulatory bodies have similar approval requirements. In addition, such foreign trials would be subject to the applicable local laws of the foreign jurisdictions where the trials are conducted. There can be no assurance that the FDA, EMA or any applicable foreign regulatory authority will accept data from trials conducted outside of its applicable jurisdiction. If the FDA, EMA or any applicable foreign regulatory authority does not accept such data, it would result in the need for additional trials, which would be costly and time-consuming and delay aspects of our business plan, and which may result in our product candidates not receiving approval or clearance for commercialization in the applicable jurisdiction.

Obtaining and maintaining regulatory approval of our product candidates in one jurisdiction does not mean that we will be successful in obtaining regulatory approval of our product candidates in other jurisdictions.

Obtaining and maintaining regulatory approval of our product candidates in one jurisdiction does not guarantee that we will be able to obtain or maintain regulatory approval in any other jurisdiction. For example, even if the FDA or EMA grants marketing approval of a product candidate, comparable regulatory authorities in foreign jurisdictions must also approve the manufacturing, marketing and promotion of the product candidate in those countries. However, a failure or delay in obtaining regulatory approval in one jurisdiction may have a negative effect on the regulatory approval process in others. Approval procedures vary among jurisdictions and can involve requirements and administrative review periods different from those in the United States, including additional preclinical studies or clinical trials as clinical trials conducted in one jurisdiction may not be accepted by regulatory authorities in other jurisdictions. In many jurisdictions outside the United States, a product candidate must be approved for reimbursement

before it can be approved for sale in that jurisdiction. In some cases, the price that we intend to charge for our products is also subject to approval.

Obtaining foreign regulatory approvals and compliance with foreign regulatory requirements could result in significant delays, difficulties and costs for us and could delay or prevent the introduction of our products in certain countries. If we or any partner we work with fail to comply with the regulatory requirements in international markets or fail to receive applicable marketing approvals, our target market will be reduced and our ability to realize the full market potential of our product candidates will be harmed.

Even if our product candidates receive regulatory approval, they will be subject to significant post-marketing regulatory requirements.

Any regulatory approvals that we may receive for our product candidates will require surveillance to monitor the safety and efficacy of the product candidate, may contain significant limitations related to use restrictions for specified age groups, warnings, precautions or contraindications, and may include burdensome post-approval study or risk management requirements. For example, the FDA may require a REMS in order to approve our product candidates, which could entail requirements for a medication guide, physician communication plans or additional elements, such as boxed warning on the packaging, to ensure safe use, such as restricted distribution methods, patient registries and other risk minimization tools. In addition, if the FDA or foreign regulatory authorities approve our product candidates, the manufacturing processes, labeling, packaging, distribution, adverse event reporting, storage, advertising, promotion, import, export and recordkeeping for our product candidates will be subject to extensive and ongoing regulatory requirements. These requirements include submissions of safety and other post-marketing information and reports, registration, as well as continued compliance with current good manufacturing practices ("cGMPs") and good clinical practices ("GCPs"), for any clinical trials that we conduct post-approval. In addition, manufacturers of drug products and their facilities are subject to continual review and periodic inspections by the FDA and other regulatory authorities for compliance with cGMP regulations and standards. If we or a regulatory agency discover previously unknown problems with a product, such as adverse events of unanticipated severity or frequency, or problems with the facilities where the product is manufactured, a regulatory agency may impose restrictions on that product, the manufacturing facility or us, including requiring recall or withdrawal of the product from the market or suspension of manufacturing. In addition, failure to comply with FDA and foreign regulatory requirements may, either before or after product approval, if any, subject our company to administrative or judicially imposed sanctions, including:

- restrictions on our ability to conduct clinical trials, including full or partial clinical holds on ongoing or planned trials;
- restrictions on the products, manufacturers or manufacturing process;
- warning or untitled letters;
- civil and criminal penalties;
- injunctions;
- suspension or withdrawal of regulatory approvals;
- product seizures, detentions or import bans;
- voluntary or mandatory product recalls and publicity requirements;
- total or partial suspension of production;
- imposition of restrictions on operations, including costly new manufacturing requirements; and
- refusal to approve pending BLAs or supplements to approved BLAs.

The occurrence of any event or penalty described above may inhibit our ability to commercialize our product candidates and generate revenue.

We may not be able to obtain orphan drug designation or obtain or maintain orphan drug exclusivity for our product candidates and, even if we do, that exclusivity may not prevent the FDA or the EMA from approving competing products.

Regulatory authorities in some jurisdictions, including the U.S. and the European Union, may designate drugs for relatively small patient populations as orphan drugs. Under the Orphan Drug Act, the FDA may designate a product as an orphan drug if it is a drug intended to treat a rare disease or condition, which is generally defined as a patient population of fewer than 200,000 individuals annually in the U.S., or a patient population greater than 200,000 in the United States where there is no reasonable expectation that the cost of developing the drug will be recovered from sales in the United States. We have obtained orphan drug designation for EG, EoD and EoE in the U.S. and for ISM in the U.S. and European Union and we may seek orphan drug designations for other indications or for other of our product candidates. There can be no assurances that we will be able to obtain such designations.

In the U.S., orphan drug designation entitles a party to financial incentives such as opportunities for grant funding towards clinical trial costs, tax advantages and user-fee waivers. In addition, if a product that has orphan drug designation subsequently receives the first FDA approval for the disease for which it has such designation, the product is entitled to orphan drug exclusivity. Orphan drug exclusivity in the U.S. provides that the FDA may not approve any other applications, including a full BLA or NDA, to market the same drug for the same indication for seven years, except in limited circumstances. The applicable exclusivity period is ten years in Europe. The European exclusivity period can be reduced to six years if a drug no longer meets the criteria for orphan drug designation or if the drug is sufficiently profitable so that market exclusivity is no longer justified.

Even if we obtain orphan drug designation for a product candidate, we may not be able to obtain or maintain orphan drug exclusivity for that product candidate. We may not be the first to obtain marketing approval of any product candidate for which we have obtained orphan drug designation for the orphan-designated indication due to the uncertainties associated with developing pharmaceutical products. In addition, exclusive marketing rights in the U.S. may be limited if we seek approval for an indication broader than the orphan-designated indication or may be lost if the FDA later determines that the request for designation was materially defective or if we are unable to assure sufficient quantities of the product to meet the needs of patients with the rare disease or condition. Further, even if we obtain orphan drug exclusivity for a product, that exclusivity may not effectively protect the product from competition because different drugs with different active moieties may be approved for the same condition. Even after an orphan drug is approved, the FDA can subsequently approve the same drug with the same active moiety for the same condition if the FDA concludes that the later drug is clinically superior in that it is shown to be safer, more effective or makes a major contribution to patient care or the manufacturer of the product with orphan exclusivity is unable to maintain sufficient product quantity. Orphan drug designation neither shortens the development time or regulatory review time of a drug nor gives the drug any advantage in the regulatory review or approval process.

Given the FDA's stated uncertainty surrounding EGID diseases, it is possible the FDA could decide EGIDs in general, or any subset of the EGID population, is a much larger market and accordingly ineligible for orphan drug status. We have obtained orphan drug designation for EG, EoD and EoE in the U.S. but further redefinitions of the EGID diseases by the FDA could cause us to lose such status. Were this to occur, we would not only lose the financial incentives and exclusivity granted to orphan drugs, we could also be forced to undertake larger or additional clinical trials which could impact our proposed timeline for introducing lirentelimab and impact our business, financial condition and results of operations.

Although we may seek a breakthrough therapy designation for lirentelimab or one or more of our other product candidates, we might not receive such designation, and even if we do, such designation may not lead to a faster development or regulatory review or approval process.

We may seek a breakthrough therapy designation for lirentelimab in one or more indications or for other product candidates. A breakthrough therapy is defined as a drug that is intended, alone or in combination with one or more other drugs, to treat a serious condition, and preliminary clinical evidence indicates that the drug may demonstrate substantial improvement over existing therapies on one or more clinically significant endpoints, such as substantial treatment effects observed early in clinical development. For drugs and biologics that have been designated as breakthrough therapies, interaction and communication between the FDA and the sponsor of the trial can help to identify the most efficient path for clinical development while minimizing the number of patients placed in ineffective

control regimens. Drugs designated as breakthrough therapies by the FDA may also be eligible for priority review if supported by clinical data at the time the NDA is submitted to the FDA.

Designation as a breakthrough therapy is within the discretion of the FDA. Accordingly, even if we believe that one of our product candidates meets the criteria for designation as a breakthrough therapy, the FDA may disagree and instead determine not to make such designation. Even if we receive breakthrough therapy designation, the receipt of such designation for a product candidate may not result in a faster development or regulatory review or approval process compared to drugs considered for approval under conventional FDA procedures and does not assure ultimate approval by the FDA. In addition, even if one or more of our product candidates qualify as breakthrough therapies, the FDA may later decide that the product candidates no longer meet the conditions for qualification or decide that the time period for FDA review or approval will not be shortened.

We may face difficulties from changes to current regulations and future legislation.

Existing regulatory policies may change and additional government regulations may be enacted that could prevent, limit or delay regulatory approval of our product candidates. We cannot predict the likelihood, nature or extent of government regulation that may arise from future legislation or administrative action, either in the U.S. or abroad. If we are slow or unable to adapt to changes in existing requirements or the adoption of new requirements or policies, or if we are not able to maintain regulatory compliance, we may lose any marketing approval that we may have obtained and we may not achieve or sustain profitability.

Certain members of Congress have made various efforts to repeal all or portions of the Affordable Care Act ("ACA"), including suspending the penalties for failing to comply with the individual insurance mandate, removing funds designed to drive enrollment in the program, repealing the "Cadillac tax" on certain high-cost, employee-sponsored health insurance plans and coming within a single vote in the U.S. Senate of repealing the ACA altogether. There is uncertainty with respect to the impact future actions by Congress or the courts may have and any changes likely will take time to unfold, and could have an impact on coverage and reimbursement for healthcare items and services covered by plans that were authorized by the ACA. However, we cannot predict the ultimate content, timing or effect of any further healthcare reform legislation or the impact of potential legislation on us. In addition, other legislative changes have been proposed and adopted since the ACA was enacted. These changes included aggregate reductions to Medicare payments to providers of up to 2% per fiscal year, effective April 1, 2013, which, due to subsequent legislative amendments, will stay in effect through 2025 unless additional Congressional action is taken. In January 2013, President Obama signed into law the American Taxpayer Relief Act of 2012, which, among other things, reduced Medicare payments to several providers, and increased the statute of limitations period for the government to recover overpayments to providers from three to five years. These laws may result in additional reductions in Medicare and other healthcare funding, which could have a material adverse effect on customers for our drugs, if approved, and accordingly, our financial operations.

We expect that the ACA, as well as other healthcare reform measures that may be adopted in the future, may result in more rigorous coverage criteria and in additional downward pressure on the price that we receive for any approved product. For example, President Biden made drug price reform a focal point of his 2020 presidential campaign. Any reduction in reimbursement from Medicare or other government programs may result in a similar reduction in payments from private payors. The implementation of cost containment measures or other healthcare reforms may prevent us from being able to generate sufficient revenue, attain profitability or commercialize our product candidates.

Legislative and regulatory proposals have been made to expand post-approval requirements and restrict sales and promotional activities for biotechnology products. We cannot be sure whether additional legislative changes will be enacted, or whether FDA regulations, guidance or interpretations will be changed, or what the impact of such changes on the marketing approvals of our product candidates, if any, may be. In addition, increased scrutiny by the U.S. Congress of the FDA's approval process may significantly delay or prevent marketing approval, as well as subject us to more stringent product labeling and post-marketing testing and other requirements.

If we fail to comply with applicable U.S. and foreign privacy and data protection laws and regulations, we may be subject to liabilities that adversely affect our business, operations and financial performance.

We are subject to federal and state laws and regulations requiring that we take measures to protect the privacy and security of certain information we gather and use in our business. For example, federal and state security breach notification laws, state health information privacy laws and federal and state consumer protection laws impose requirements regarding the collection, use, disclosure and storage of personal information. In addition, in June 2018, California enacted the California Consumer Privacy Act (the "CCPA"), which took effect on January 1, 2020. The CCPA gives California residents expanded rights to access and require deletion of their personal information, opt out of certain personal information sharing, and receive detailed information about how their personal information is used. The CCPA provides for civil penalties for violations, as well as a private right of action for data breaches that may increase data breach litigation. Although the CCPA includes exemptions for certain clinical trials data, and HIPAA protected health information, the law may increase our compliance costs and potential liability with respect to other personal information we collect about California residents. Additionally, the California Privacy Rights Act, amending and expanding CCPA, was passed via ballot initiative during the November 2020 election, which will further strengthen privacy laws in California and create a new privacy regulatory agency in the state. The CCPA has prompted a number of proposals for new federal and state privacy legislation that, if passed, could increase our potential liability, increase our compliance costs and adversely affect our business.

We may also be subject to or affected by foreign laws and regulations, including regulatory guidance, governing the collection, use, disclosure, security, transfer and storage of personal data, such as information that we collect about patients and healthcare providers in connection with clinical trials and our other operations in the U.S. and abroad. The global legislative and regulatory landscape for privacy and data protection continues to evolve, and implementation standards and enforcement practices are likely to remain uncertain for the foreseeable future. This evolution may create uncertainty in our business, result in liability or impose additional costs on us. The cost of compliance with these laws, regulations and standards is high and is likely to increase in the future. For example, the EU has adopted the General Data Protection Regulation (the "GDPR"), which introduces strict requirements for processing personal data. The GDPR increases our compliance burden with respect to data protection, including by mandating potentially burdensome documentation requirements and granting certain rights to individuals to control how we collect, use, disclose, retain and leverage information about them. The processing of sensitive personal data, such as information about health conditions, entails heightened compliance burdens under the GDPR and is a topic of active interest among foreign regulators. In addition, the GDPR provides for breach reporting requirements, more robust regulatory enforcement and fines of up to the greater of 20 million euros or 4% of annual global revenue. While companies are afforded some flexibility in determining how to comply with the GDPR's various requirements, significant effort and expense are required to ensure continuing compliance with the GDPR. Moreover, the requirements under the GDPR and guidance issued by different EU member states may change periodically or may be modified, and such changes or modifications could have an adverse effect on our business operations if compliance becomes substantially costlier than under current requirements. For example, on July 16, 2020, the Court of Justice of the European Union invalidated the EU-US Privacy Shield Framework under which personal data could be transferred from the EEA to United States entities that had self-certified under the Privacy Shield scheme. It is currently unclear what additional measures will need to be put in place as a result of this court ruling. It is also possible that each of these privacy laws may be interpreted and applied in a manner that is inconsistent with our practices. Any failure or perceived failure by us to comply with federal, state, or foreign laws or self-regulatory standards could result in negative publicity, diversion of management time and effort, proceedings against us by governmental entities or others, and fines. In many jurisdictions, enforcement actions and consequences for noncompliance are rising. As we continue to expand into other foreign countries and jurisdictions, we may be subject to additional laws and regulations that may affect how we conduct business.

Our relationships with customers and third-party payors will be subject to applicable anti-kickback, fraud and abuse, transparency and other healthcare laws and regulations, which could expose us to, among other things, criminal sanctions, civil penalties, contractual damages, reputational harm, administrative burdens and diminished profits and future earnings.

Healthcare providers and third-party payors play a primary role in the recommendation and prescription of any product candidates for which we obtain marketing approval. Our future arrangements with third-party payors and customers may expose us to broadly applicable fraud and abuse and other healthcare laws and regulations that may

constrain the business or financial arrangements and relationships through which we market, sell and distribute our products for which we obtain marketing approval. Restrictions under applicable federal and state healthcare laws and regulations, include the following:

- the federal Anti-Kickback Statute prohibits, among other things, persons and entities from knowingly and willfully soliciting, offering, receiving or providing remuneration, directly or indirectly, in cash or in kind, to induce or reward, or in return for, either the referral of an individual for, or the purchase, order or recommendation of, any good or service, for which payment may be made under a federal healthcare program such as Medicare and Medicaid;
- the federal false claims and civil monetary penalties laws, including the civil False Claims Act, impose criminal and civil penalties, including civil whistleblower or qui tam actions, against individuals or entities for, among other things, knowingly presenting, or causing to be presented, to the federal government, claims for payment that are false or fraudulent or making a false statement to avoid, decrease or conceal an obligation to pay money to the federal government;
- the federal Health Insurance Portability and Accountability Act of 1996 ("HIPAA"), imposes criminal and civil liability for, among other things, executing or attempting to execute a scheme to defraud any healthcare benefit program or making false statements relating to healthcare matters;
- HIPAA, as amended by the Health Information Technology for Economic and Clinical Health Act and its implementing regulations, also imposes obligations, including mandatory contractual terms, with respect to safeguarding the privacy, security and transmission of individually identifiable health information;
- the federal Physician Payments Sunshine Act requires applicable manufacturers of covered drugs, devices, biologics and medical supplies for which payment is available under Medicare, Medicaid or the Children's Health Insurance Program, with specific exceptions, to annually report to CMS information regarding payments and other transfers of value to physicians and teaching hospitals as well as information regarding ownership and investment interests held by physicians and their immediate family members. The information was made publicly available on a searchable website in September 2014 and will be disclosed on an annual basis; and
- analogous state and foreign laws and regulations, such as state anti-kickback and false claims laws, may apply to sales or marketing arrangements and claims involving healthcare items or services reimbursed by non-governmental third-party payors, including private insurers.

Some state laws require biotechnology companies to comply with the biotechnology industry's voluntary compliance guidelines and the relevant compliance guidance promulgated by the federal government and may require drug manufacturers to report information related to payments and other transfers of value to physicians and other healthcare providers or marketing expenditures. State and foreign laws also govern the privacy and security of health information in some circumstances, many of which differ from each other in significant ways and often are not preempted by HIPAA, thus complicating compliance efforts.

Efforts to ensure that our current and future business arrangements with third-parties will comply with applicable healthcare laws and regulations will involve substantial costs. It is possible that governmental authorities will conclude that our business practices may not comply with current or future statutes, regulations or case law involving applicable fraud and abuse or other healthcare laws and regulations. If our operations are found to be in violation of any of these laws or any other governmental regulations that may apply to us, we may be subject to significant penalties, including civil, criminal and administrative penalties, damages, fines, disgorgement, imprisonment, exclusion from participation in government funded healthcare programs, such as Medicare and Medicaid, contractual damages, reputational harm, diminished profits and future earnings and the curtailment or restructuring of our operations. Defending against any such actions can be costly, time-consuming and may require significant financial and personnel resources. Therefore, even if we are successful in defending against any such actions that may be brought against us, our business may be impaired. Further, if any of the physicians or other healthcare providers or entities with whom we expect to do business is found to be not in compliance with applicable laws, they may be subject to criminal, civil or administrative sanctions, including exclusions from government funded healthcare programs.

Risks Related to Employee Matters, Managing Our Growth and Other Risks Related to Our Business

Our success is highly dependent on the services of our Chief Executive Officer, Dr. Robert Alexander, and our President and Chief Operating Officer, Dr. Adam Tomasi, and our ability to attract and retain highly skilled executive officers and employees.

To succeed, we must recruit, retain, manage and motivate qualified clinical, scientific, technical and management personnel, and we face significant competition for experienced personnel. We are highly dependent on the principal members of our management and scientific and medical staff, particularly our Chief Executive Officer, Dr. Robert Alexander, and our President and Chief Operating Officer, Dr. Adam Tomasi. If we do not succeed in attracting and retaining qualified personnel, particularly at the management level, it could adversely affect our ability to execute our business plan and harm our operating results. In particular, the loss of one or more of our executive officers, including Dr. Alexander or Dr. Tomasi, could be detrimental to us if we cannot recruit suitable replacements in a timely manner. The competition for qualified personnel in the biotechnology field is intense and as a result, we may be unable to continue to attract and retain qualified personnel necessary for the future success of our business. In addition to competition for personnel, the San Francisco Bay Area in particular is characterized by a high cost of living. We could in the future have difficulty attracting experienced personnel to our company and may be required to expend significant financial resources in our employee recruitment and retention efforts.

Many of the other biotechnology companies that we compete against for qualified personnel have greater financial and other resources, different risk profiles and a longer history in the industry than we do. They also may provide more diverse opportunities and better prospects for career advancement. Some of these characteristics may be more appealing to high-quality candidates than what we have to offer. If we are unable to continue to attract and retain high-quality personnel, the rate and success at which we can discover, develop and commercialize our product candidates will be limited and the potential for successfully growing our business will be harmed.

If we are unable to establish sales or marketing capabilities or enter into agreements with third-parties to sell or market our product candidates, we may not be able to successfully sell or market our product candidates that obtain regulatory approval.

We currently have a small commercial team which will need to be expanded substantially to support the marketing, sales and distribution of any of our product candidates that may be able to obtain regulatory approval. In order to commercialize any product candidates, we must build marketing, sales, distribution, managerial and other non-technical capabilities or make arrangements with third-parties to perform these services for each of the territories in which we may have approval to sell or market our product candidates. We may not be successful in accomplishing these required tasks.

Establishing an internal sales or marketing team with technical expertise and supporting distribution capabilities to commercialize our product candidates will be expensive and time-consuming, and will require significant attention of our executive officers to manage. Any failure or delay in the development of our internal sales, marketing and distribution capabilities could adversely impact the commercialization of any of our product candidates that we obtain approval to market, if we do not have arrangements in place with third-parties to provide such services on our behalf. Alternatively, if we choose to collaborate, either globally or on a territory-by-territory basis, with third-parties that have direct sales forces and established distribution systems, either to augment our own sales force and distribution systems or in lieu of our own sales force and distribution systems, we will be required to negotiate and enter into arrangements with such third-parties relating to the proposed collaboration. If we are unable to enter into such arrangements when needed on acceptable terms, or at all, we may not be able to successfully commercialize any of our product candidates that receive regulatory approval or any such commercialization may experience delays or limitations. If we are unable to successfully commercialize our approved product candidates, either on our own or through collaborations with one or more third-parties, our future product revenue will suffer and we may incur significant additional losses.

In order to successfully implement our plans and strategies, we will need to grow the size of our organization, and we may experience difficulties in managing this growth.

At December 31, 2021, we had 192 full-time employees, including 132 employees engaged in research and development. In order to successfully implement our development and commercialization plans and strategies, we expect to need additional managerial, operational, sales, marketing, financial and other personnel. Future growth would impose significant added responsibilities on members of management, including:

- identifying, recruiting, integrating, maintaining and motivating additional employees;
- managing our internal development efforts effectively, including the clinical and FDA review process for lirentelimab and any other future product candidates, while complying with any contractual obligations to contractors and other third-parties we may have; and
- improving our operational, financial and management controls, reporting systems and procedures.

Our future financial performance and our ability to successfully develop and, if approved, commercialize lirentelimab and any other future product candidates will depend, in part, on our ability to effectively manage any future growth, and our management may also have to divert a disproportionate amount of its attention away from day-to-day activities in order to devote a substantial amount of time to managing these growth activities. In addition, if we reduce our workforce, as we did in early 2022, in order to reduce operating costs or for other reasons, the rate and success at which we can discover, develop and commercialize our product candidates may be limited and the potential for successfully growing our business may be harmed.

We currently rely, and for the foreseeable future will continue to rely, in substantial part on certain independent organizations, advisors and consultants to provide certain services, including most aspects of clinical management and manufacturing. We cannot assure you that the services of independent organizations, advisors and consultants will continue to be available to us on a timely basis when needed, or that we can find qualified replacements. In addition, if we are unable to effectively manage our outsourced activities or if the quality or accuracy of the services provided by third-party service providers is compromised for any reason, our clinical trials may be extended, delayed or terminated, and we may not be able to obtain marketing approval of lirentelimab and any other future product candidates or otherwise advance our business. We cannot assure you that we will be able to manage our existing third-party service providers or find other competent outside contractors and consultants on economically reasonable terms, or at all.

If we are not able to effectively expand our organization by hiring new employees and/or engaging additional third-party service providers, we may not be able to successfully implement the tasks necessary to further develop and commercialize lirentelimab and any other future product candidates and, accordingly, may not achieve our research, development and commercialization goals.

Risks Related to Intellectual Property

If we are unable to obtain or protect intellectual property rights, we may not be able to compete effectively in our market.

Our success depends in significant part on our and our current or future licensors' ability to establish, maintain and protect patents and other intellectual property rights and operate without infringing the intellectual property rights of others. We have filed numerous patent applications both in the United States and in foreign jurisdictions to obtain patent rights to inventions we have developed. We have also licensed from third-parties rights to patent portfolios. Some of these licenses give us the right to prepare, file and prosecute patent applications and maintain and enforce patents we have licensed, and other licenses may not give us such rights.

The patent prosecution process is expensive and time-consuming, and we and our current or future licensors may not be able to prepare, file and prosecute all necessary or desirable patent applications at a reasonable cost or in a timely manner. It is also possible that we or our current and future licensors will fail to identify patentable aspects of inventions made in the course of development and commercialization activities before it is too late to obtain patent protection on them. Moreover, in some circumstances, we may not have the right to control the preparation, filing and prosecution of patent applications, or to maintain the patents, covering technology that we license from third-parties

and are reliant on our current and future licensors. Therefore, these patents and applications may not be prosecuted and enforced in a manner consistent with the best interests of our business. If our current or future licensors fail to establish, maintain or protect such patents and other intellectual property rights, such rights may be reduced or eliminated. If our current and future licensors 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.

The patent position of biotechnology companies generally is highly uncertain, involves complex legal and factual questions and has in recent years been the subject of much litigation. As a result, the issuance, scope, validity, enforceability and commercial value of our and our current or future licensors' patent rights are highly uncertain. Our and our current or future licensors' pending and future patent applications may not result in patents being issued which protect our technology or products, in whole or in part, or which effectively prevent others from commercializing competitive technologies and products. The patent examination process may require us or our current and future licensors to narrow the scope of the claims of our or our current and future licensors' pending and future patent applications, which may limit the scope of patent protection that may be obtained.

We cannot assure you that all of the potentially relevant prior art relating to our patents and patent applications has been found. If such prior art exists, it can invalidate a patent or prevent a patent from issuing from a pending patent application. Even if patents do successfully issue and even if such patents cover our product candidates, third-parties may initiate an opposition, interference, re-examination, post-grant review, *inter partes* review, nullification or derivation action in court or before patent offices, or similar proceedings challenging the validity, enforceability or scope of such patents, which may result in the patent claims being narrowed or invalidated. Our and our current or future licensors' patent applications cannot be enforced against third-parties practicing the technology claimed in such applications unless and until a patent issues from such applications, and then only to the extent the issued claims cover the technology.

Because patent applications in the United States and most other countries are confidential for a period of time after filing, and some remain so until issued, we cannot be certain that we or our current and future licensors were the first to file any patent application related to a product candidate. Furthermore, if third-parties have filed such patent applications on or before March 15, 2013, an interference proceeding in the United States can be initiated by such third-parties to determine who was the first to invent any of the subject matter covered by the patent claims of our applications. If third-parties have filed such applications after March 15, 2013, a derivation proceeding in the United States can be initiated by such third-parties to determine whether our invention was derived from theirs. Even where we have a valid and enforceable patent, we may not be able to exclude others from practicing our invention where the other party can show that they used the invention in commerce before our filing date or the other party benefits from a compulsory license. In addition, patents have a limited lifespan. In the United States, if all maintenance fees are timely paid, the natural expiration of a patent is generally 20 years from its earliest U.S. filing date. Various extensions may be available, but the life of a patent, and the protection it affords, is limited. Even if patents covering our product candidates are obtained, once the patent life has expired for a product, we may be open to competition from competitive medications, including biosimilar or generic medications. For example, one of our owned patent families that claims one of the product candidates will expire in 2035 in the United States and similar patent applications are pending in foreign jurisdictions with a projected expiration date in 2034, at which time the underlying technology covered by such patents can be used by any third-party, including competitors. Although the patent term extensions under the Hatch-Waxman Act in the United States may be available to extend the patent term, we cannot provide any assurances that any such patent term extension will be obtained and, if so, for how long.

Due to the amount of time required for the development, testing and regulatory review of new product candidates, patents protecting such candidates might expire before or shortly after such candidates are commercialized. As a result, our owned and licensed patent portfolio may not provide us with sufficient rights to exclude others from commercializing products similar or identical to ours. We expect to seek extensions of patent terms where these are available in any countries where we are prosecuting patents. This includes in the United States under the Drug Price Competition and Patent Term Restoration Act of 1984, which permits a patent term extension of up to five years beyond the expiration of the patent. However, the applicable authorities, including the FDA and the U.S. Patent and Trademark Office ("USPTO") in the United States, and any equivalent foreign regulatory authority, may not agree with our assessment of whether such extensions are available, and may refuse to grant extensions to our patents, or may grant more limited extensions than we request. If this occurs, our competitors may take advantage of our

investment in development and clinical trials by referencing our clinical and preclinical data and launch their product earlier than might otherwise be the case.

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

Filing, prosecuting, enforcing and defending patents on product candidates in all countries throughout the world would be prohibitively expensive, and our or our current and future licensors' intellectual property rights may not exist in some countries outside the United States or may be less extensive in some countries than in the United States. In addition, the laws of some foreign countries do not protect intellectual property rights to the same extent as federal and state laws in the United States. Consequently, we and our current and future licensors may not be able to prevent third-parties from practicing our and our current or future licensors' inventions in all countries outside the United States, or from selling or importing products made using our and our current or future licensors' inventions in and into the United States or other jurisdictions. Competitors may use our and our current or future licensors' 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 and our current and future licensors have patent protection, but enforcement is not as strong as that in the United States. These products may compete with our product candidates, and our and our current or future licensors' 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 biotechnology, which could make it difficult for us and our current and future licensors to stop the infringement of our and our current or future licensors' patents or marketing of competing products in violation of our and our current or future licensors' proprietary rights generally. Proceedings to enforce our and our current or future licensors' patent rights in foreign jurisdictions could result in substantial costs and divert our and our current or future licensors' efforts and attention from other aspects of our business, could put our and our current or future licensors' patents at risk of being invalidated or interpreted narrowly and our and our current or future licensors' patent applications at risk of not issuing and could provoke third-parties to assert claims against us or our current and future licensors. We or our current and future licensors may not prevail in any lawsuits that we or our current and future licensors initiate, and the damages or other remedies awarded, if any, may not be commercially meaningful.

Many countries have compulsory licensing laws under which a patent owner may be compelled to grant licenses to third-parties. In addition, many countries limit the enforceability of patents against government agencies or government contractors. In these countries, the patent owner may have limited remedies, which could materially diminish the value of such patent. If we or our current and future licensors are forced to grant a license to third-parties with respect to any patents relevant to our business, our competitive position may be impaired, and our business, financial condition, results of operations and prospects may be adversely affected.

Changes in 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 is therefore costly, time-consuming and inherently uncertain. Changes in either the patent laws or interpretation of the patent laws in the United States could increase the uncertainties and costs. Patent reform legislation in the United States and other countries, including the Leahy-Smith America Invents Act ("Leahy-Smith Act"), signed into law on September 16, 2011, could increase those uncertainties and costs surrounding the prosecution of our patent applications and the enforcement or defense of our issued patents. The Leahy-Smith Act includes a number of significant changes to U.S. patent law. These include provisions that affect the way patent applications are prosecuted, redefine prior art and provide more efficient and cost-effective avenues for competitors to challenge the validity of patents. These include allowing third-party submission of prior art to the USPTO during patent prosecution and additional procedures to attack the validity of a patent by USPTO administered post-grant proceedings, including post-grant review, *inter partes* review and derivation proceedings. After March 15, 2013, under the Leahy-Smith Act, the United States transitioned to a first inventor to file system in which, assuming that the other statutory requirements are met, the first inventor to file a patent application will be entitled to the patent on an invention regardless of whether a third-party was the first to invent the claimed invention. However, the Leahy-Smith Act 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, financial condition, results of operations and prospects.

The U.S. Supreme Court has ruled on several patent cases in recent years, either narrowing the scope of patent protection available in certain circumstances or weakening the rights of patent owners in certain situations. Depending on future actions by the U.S. Congress, the U.S. courts, the USPTO and the relevant law-making bodies in other countries, the laws and regulations governing patents could change in unpredictable ways that would weaken our ability to obtain new patents or to enforce our existing patents and patents that we might obtain in the future.

Obtaining and maintaining our patent protection depends on compliance with various procedural, document submission, 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 and annuity fees on any issued patent are due to be paid to the USPTO and foreign patent agencies in several stages over the lifetime of the patent. The USPTO and various foreign governmental patent agencies require compliance with a number of procedural, documentary, fee payment and other similar provisions during the patent application process. While an inadvertent lapse can in many cases be cured by payment of a late fee or by other means in accordance with the applicable rules, 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. Non-compliance events that could result in abandonment or lapse of a patent or patent application include failure to respond to official actions within prescribed time limits, non-payment of fees and failure to properly legalize and submit formal documents. If we or our current and future licensors fail to maintain the patents and patent applications covering our product candidates, our patent protection could be reduced or eliminated and our competitors might be better able to enter the market with competing products.

If our trademark and tradenames are not adequately protected, then we may not be able to build name recognition in our markets and our business may be adversely affected.

We cannot assure you that competitors will not infringe our trademarks or that we will have adequate resources to enforce our trademarks. In addition, we do not own any registered trademarks for the mark “ALLAKOS.” We cannot assure you that any future trademark applications that we will file will be approved. During trademark registration proceedings, we may receive rejections and although we are given an opportunity to respond to those rejections, we may be unable to overcome such rejections. In addition, in proceedings before the USPTO and in proceedings before comparable agencies in many foreign jurisdictions, third-parties are given an opportunity to oppose pending trademark applications and to seek to cancel registered trademarks. Opposition or cancellation proceeding may be filed against our trademarks and our trademarks may not survive such proceedings, which may force us to rebrand our name.

If we breach the license agreements related to our product candidates, we could lose the ability to continue the development and commercialization of our product candidates.

Our commercial success depends upon our ability, and the ability of our current and future licensors, to develop, manufacture, market and sell our product candidates and use our and our current or future licensors’ wholly-owned technologies without infringing the proprietary rights of third-parties. A third-party may hold intellectual property, including patent rights that are important or necessary to the development of our products. As a result, we are a party to a number of technology licenses that are important to our business. For example, we have obtained an exclusive license under certain intellectual property related to Siglec-8 from The Johns Hopkins University to develop certain products and a non-exclusive license from BioWa and Lonza to develop and commercialize products manufactured in a particular mammalian host cell line. If we fail to comply with the obligations under these agreements, including payment and diligence terms, our current and future licensors may have the right to terminate these agreements, in which event we may not be able to develop, manufacture, market or sell any product that is covered by these agreements or may face other penalties under the agreements. Such an occurrence could adversely affect the value of the product candidate being developed under any such agreement. Termination of these agreements or reduction or elimination of our rights under these agreements may result in our having to negotiate new or reinstated agreements,

which may not be available to us on equally favorable terms, or at all, or cause us to lose our rights under these agreements, including our rights to intellectual property or technology important to our development programs.

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

- the scope of rights granted under the license agreement and other interpretation-related issues;
- the extent to which our technology and processes infringe on intellectual property of the licensor that is not subject to the licensing agreement;
- the sublicensing of patent and other rights under any collaboration relationships we might enter into in the future;
- our diligence obligations under the license agreement and what activities satisfy those diligence obligations;
- the inventorship and ownership of inventions and know-how resulting from the joint creation or use of intellectual property by our current and future licensors and us; and
- the priority of invention of patented technology.

If disputes over intellectual property that we have licensed prevent or impair our ability to maintain our current licensing arrangements on acceptable terms, we may be unable to successfully develop and commercialize the affected product candidates.

Third-parties may initiate legal proceedings against us alleging that we infringe their intellectual property rights or we may initiate legal proceedings against third-parties to challenge the validity or scope of intellectual property rights controlled by third-parties, the outcome of which would be uncertain and could have an adverse effect on the success of our business.

Third-parties may initiate legal proceedings against us or our current and future licensors alleging that we or our current and future licensors infringe their intellectual property rights, or we or our current and future licensors may initiate legal proceedings against third-parties to challenge the validity or scope of intellectual property rights controlled by third-parties, including in oppositions, interferences, reexaminations, *inter partes* reviews or derivation proceedings in the United States or other jurisdictions. These proceedings can be expensive and time-consuming, and many of our or our current and future licensors' adversaries in these proceedings may have the ability to dedicate substantially greater resources to prosecuting these legal actions than we or our current and future licensors.

Parties making claims against us may obtain injunctive or other equitable relief, which could effectively block our ability to further develop and commercialize one or more of our product candidates. Defense of these claims, regardless of their merit, would involve substantial litigation expense and would be a substantial diversion of management and employee resources from our business. An unfavorable outcome could require us or our current and future licensors to cease using the related technology or developing or commercializing our product candidates, or to attempt to license rights to it from the prevailing party. Our business could be harmed if the prevailing party does not offer us or our current and future licensors a license on commercially reasonable terms or at all. Even if we or our current and future licensors obtain a license, it may be non-exclusive, thereby giving our competitors access to the same technologies licensed to us or our current and future licensors. In addition, we could be found liable for monetary damages, including treble damages and attorneys' fees, if we are found to have willfully infringed a patent. A finding of infringement could prevent us from commercializing our product candidates or force us to cease some of our business operations, which could harm our business.

We may be subject to claims by third-parties asserting that our employees or we have misappropriated their intellectual property, or claiming ownership of what we regard as our own intellectual property.

Many of our employees, including our senior management, were previously employed at other biopharmaceutical companies, including potential competitors. Some of these employees executed proprietary rights, non-disclosure and/or non-competition agreements in connection with such previous employment. Although we try to ensure that our employees do not use the proprietary information or know-how of others in their work for us, we may be subject to claims that we or these employees have used or disclosed confidential information or intellectual

property, including trade secrets or other proprietary information, of any such employee's former employer. Litigation may be necessary to defend against these claims.

If we fail in prosecuting or defending any such claims, in addition to paying monetary damages, we may lose valuable intellectual property rights or personnel or sustain damages. Such intellectual property rights could be awarded to a third-party, and we could be required to obtain a license from such third-party to commercialize our technology or products. Such a license may not be available on commercially reasonable terms or at all. Even if we successfully prosecute or defend against such claims, litigation could result in substantial costs and distract management.

Our inability to protect our confidential information and trade secrets would harm our business and competitive position.

In addition to seeking patents for some of our technology and products, we also rely on trade secrets, including unpatented know-how, technology and other proprietary information, to maintain our competitive position. Trade secrets can be difficult to protect. We seek to protect these trade secrets, in part, by entering into non-disclosure and confidentiality agreements with parties who have access to them, such as our employees, contract manufacturers, consultants, advisors and other third-parties. We also enter into confidentiality and invention or patent assignment agreements with our employees and consultants. Despite these efforts, any of the parties may breach the agreements and disclose our proprietary information, including our trade secrets, and we may not be able to obtain adequate remedies for such breaches. Misappropriation or unauthorized disclosure of our trade secrets could significantly affect our competitive position and may have a material adverse effect on our business. Enforcing a claim that a party illegally disclosed or misappropriated a trade secret is difficult, expensive and time-consuming, and the outcome is unpredictable. Some courts both within and outside the United States may be less willing or unwilling to protect trade secrets. Furthermore, trade secret protection does not prevent competitors from independently developing substantially equivalent information and techniques and we cannot guarantee that our competitors will not independently develop substantially equivalent information and techniques. If a competitor lawfully obtained or independently developed any of our trade secrets, we would have no right to prevent such competitor from using that technology or information to compete with us. Failure on our part to adequately protect our trade secrets and our confidential information would harm our business and our competitive position.

Risks Related to Our Dependence on Third-Parties

We rely on third-parties to conduct our clinical trials and those third-parties may not perform satisfactorily, including failing to meet deadlines for the completion of such trials, research and studies.

We do not have the ability to independently conduct our clinical trials. We currently rely on third-parties, such as CROs, clinical data management organizations, medical institutions and clinical investigators, to conduct our clinical trials of lirentelimab and expect to continue to rely upon third-parties to conduct additional clinical trials of lirentelimab and our other product candidates. Third-parties have a significant role in the conduct of our clinical trials and the subsequent collection and analysis of data. These third-parties are not our employees, and except for remedies available to us under our agreements, we have limited ability to control the amount or timing of resources that any such third-party will devote to our clinical trials. Some of these third-parties may terminate their engagements with us at any time. If we need to enter into alternative arrangements, it would delay our drug development activities.

Our reliance on these third-parties for research and development activities will reduce our control over these activities but will not relieve us of our regulatory responsibilities. For example, we will remain responsible for ensuring that each of our clinical trials is conducted in accordance with the general investigational plan and protocols for the trial. Moreover, the FDA requires us to comply with GCP standards, regulations for conducting, recording and reporting the results of clinical trials to assure that data and reported results are credible and accurate and that the rights, integrity and confidentiality of trial participants are protected. The EMA also requires us to comply with similar standards. Regulatory authorities enforce these GCP requirements through periodic inspections of trial sponsors, principal investigators and trial sites. If we or any of our CROs fail to comply with applicable GCP requirements, the clinical data generated in our clinical trials may be deemed unreliable and the FDA, EMA or comparable foreign regulatory authorities may require us to perform additional clinical trials before approving our marketing applications. We cannot assure you that upon inspection by a given regulatory authority, such regulatory authority will determine

that any of our clinical trials comply with GCP regulations. In addition, our clinical trials must be conducted with product produced under cGMP regulations. Our failure to comply with these regulations may require us to repeat clinical trials, which would delay the marketing approval process. We also are required to register certain ongoing clinical trials and post the results of certain completed clinical trials on a government-sponsored database, ClinicalTrials.gov, within certain timeframes. Failure to do so can result in fines, adverse publicity and civil and criminal sanctions.

The third-parties we rely on for these services may also have relationships with other entities, some of which may be our competitors. If these third-parties do not successfully carry out their contractual duties, meet expected deadlines or conduct our clinical trials in accordance with regulatory requirements or our stated protocols, we will not be able to obtain, or may be delayed in obtaining, marketing approvals for our product candidates and will not be able to, or may be delayed in our efforts to, successfully commercialize our product candidates.

We contract with third-parties for the production of our product candidates for preclinical studies and, in the case of lirentelimab, our ongoing clinical trials, and expect to continue to do so for additional clinical trials and ultimately for commercialization. This reliance on third-parties increases the risk that we will not have sufficient quantities of our product candidates or drugs or such quantities at an acceptable cost, which could delay, prevent or impair our development or commercialization efforts.

We do not currently have the infrastructure or internal capability to manufacture supplies of our product candidates for use in development and commercialization. We rely, and expect to continue to rely, on third-party manufacturers for the production of our product candidates for preclinical studies and clinical trials under the guidance of members of our organization. In the case of lirentelimab, we have previously relied on a single third-party manufacturer and we are currently in the process of developing alternative manufacturing capabilities. If we were to experience an unexpected loss of supply of lirentelimab, or any of our other product candidates, for any reason, whether as a result of manufacturing, supply or storage issues or otherwise, including issues related to the COVID-19 global pandemic, we could experience delays, disruptions, suspensions or terminations of, or be required to restart or repeat, any pending or ongoing clinical trials.

We expect to continue to rely on third-party manufacturers for the commercial supply of any of our product candidates for which we may obtain marketing approval. We may be unable to maintain required agreements with third-party manufacturers or to do so on acceptable terms. Reliance on third-party manufacturers entails additional risks, including:

- the possible failure of the third-party to manufacture our product candidate according to our schedule and scale, or at all, including if our third-party contractors give greater priority to the supply of other products over our product candidates or otherwise do not satisfactorily perform according to the terms of the agreements between us and them;
- the possible termination or nonrenewal of agreements by our third-party contractors at a time that is costly or inconvenient for us;
- the possible breach by the third-party contractors of our agreements with them;
- the failure of third-party contractors to comply with applicable regulatory requirements;
- the possible failure of the third-party to manufacture our product candidates according to our specifications;
- the possible mislabeling of clinical supplies, potentially resulting in the wrong dose amounts being supplied or active drug or placebo not being properly identified;
- the possibility of clinical supplies not being delivered to clinical sites on time, leading to clinical trial interruptions, or of drug supplies not being distributed to commercial vendors in a timely manner, resulting in lost sales; and
- the possible misappropriation of our proprietary information, including our trade secrets and know-how.

We do not have complete control over all aspects of the manufacturing process of, and are dependent on, our contract manufacturing partners for compliance with cGMP regulations for manufacturing both active drug substances and finished drug products. Third-party manufacturers may not be able to comply with cGMP regulations or similar regulatory requirements outside of the United States. If our contract manufacturers cannot successfully manufacture material that conforms to our specifications and the strict regulatory requirements of the FDA or others, they will not be able to secure and/or maintain marketing approval for their manufacturing facilities. In addition, we do not have control over the ability of our contract manufacturers to maintain adequate quality control, quality assurance and qualified personnel. If the FDA or a comparable foreign regulatory authority does not approve these facilities for the manufacture of our product candidates or if it withdraws any such approval in the future, we may need to find alternative manufacturing facilities, which would significantly impact our ability to develop, obtain marketing approval for or market our product candidates, if approved. Our failure, or the failure of our third-party manufacturers, to comply with applicable regulations could result in sanctions being imposed on us, including fines, injunctions, civil penalties, delays, suspension or withdrawal of approvals, license revocation, seizures or recalls of product candidates or drugs, operating restrictions and criminal prosecutions, any of which could significantly and adversely affect supplies of our drugs and harm our business and results of operations.

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

We may not gain the efficiencies we expect from further scale-up of manufacturing of lirentelimab, and our third-party manufacturers may be unable to successfully scale-up manufacturing in sufficient quality and quantity for lirentelimab or our other product candidates, which could delay or prevent the conducting of our clinical trials or the development or commercialization of our other product candidates.

Our third-party manufacturers are currently manufacturing lirentelimab at a scale that is sufficient for us to complete our planned clinical trials. However, we are in the process of increasing the batch scale to gain cost efficiencies. If our manufacturers are unable to scale-up the manufacturing of lirentelimab, we may not gain such cost efficiencies and may not realize the benefits that would typically be expected from further scale-up of manufacturing of lirentelimab.

In addition, in order to conduct clinical trials of any of our other product candidates, we may need to manufacture them in large quantities. Our third-party manufacturers, including Lonza, may be unable to successfully increase the manufacturing capacity for any of these product candidates in a timely or cost-effective manner, or at all. In addition, quality issues may arise during scale-up activities. If our third-party manufacturers are unable to successfully scale up the manufacture of our other product candidates in sufficient quality and quantity, the development, testing and clinical trials of that product candidate may be delayed or become infeasible, and marketing approval or commercial launch of any resulting product may be delayed or not obtained, which could significantly harm our business.

Changes in methods of product candidate manufacturing or formulation may result in additional costs or delay.

As product candidates progress through preclinical and late stage clinical trials to marketing approval and commercialization, it is common that various aspects of the development program, such as manufacturing methods and formulation, are altered along the way in an effort to optimize yield, manufacturing batch size, minimize costs and achieve consistent quality and results. Such changes carry the risk that they will not achieve these intended objectives. Any of these changes could cause our product candidates to perform differently and affect the results of planned clinical trials or other future clinical trials conducted with the altered materials. This could delay completion of clinical trials, require the conduct of bridging clinical trials or the repetition of one or more clinical trials, increase clinical trial costs, delay approval of our product candidates and jeopardize our ability to commercialize our product candidates and generate revenue.

The manufacture of biologics is complex and our third-party manufacturers may encounter difficulties in production. If any of our third-party manufacturers encounter such difficulties, our ability to provide adequate supply of our product candidates for clinical trials or our products for patients, if approved, could be delayed or prevented.

Manufacturing biologics, especially in large quantities, is complex and may require the use of innovative technologies to handle living cells. Each lot of an approved biologic must undergo thorough testing for identity, strength, quality, purity and potency. Manufacturing biologics requires facilities specifically designed for and validated for this purpose, and sophisticated quality assurance and quality control procedures are necessary. Slight deviations anywhere in the manufacturing process, including filling, labeling, packaging, storage and shipping and quality control and testing, may result in lot failures, product recalls or spoilage. If our current manufacturing locations become unavailable at their anticipated capacities or the location of the manufacturing of lirentelimab or our other product candidates is changed for any reason, including for reasons related to the COVID-19 global pandemic, it could result in a delay or disruption to the manufacturing process or lead to difficulties that we did not experience at the original manufacturing locations. When changes are made to the manufacturing process, we may be required to provide preclinical and clinical data showing the comparable identity, strength, quality, purity or potency of the products before and after such changes. If microbial, viral or other contaminations are discovered at the facilities of our manufacturer, such facilities may need to be closed for an extended period of time to investigate and remedy the contamination, which could delay clinical trials and adversely harm our business. The use of biologically derived ingredients can also lead to allegations of harm, including infections or allergic reactions, or closure of product facilities due to possible contamination. If our manufacturers are unable to produce sufficient quantities for clinical trials or for commercialization as a result of these challenges, our development and commercialization efforts would be impaired, which would have an adverse effect on our business, financial condition, results of operations and growth prospects.

If we decide to establish collaborations, but are not able to establish those collaborations, we may have to alter our development and commercialization plans.

Our drug development programs and the potential commercialization of our product candidates will require substantial additional cash to fund expenses. We may seek to selectively form collaborations to expand our capabilities, potentially accelerate research and development activities and provide for commercialization activities by third-parties.

We would face significant competition in seeking appropriate collaborators. Whether we reach a definitive agreement for a collaboration will depend, among other things, upon our assessment of the collaborator's resources and expertise, the terms and conditions of the proposed collaboration and the proposed collaborator's evaluation of a number of factors. Those factors may include the design or results of clinical trials, the likelihood of approval by the FDA or comparable foreign regulatory authorities, the potential market for the subject product candidate, the costs and complexities of manufacturing and delivering such product candidate to patients, the potential of competing drugs, the existence of uncertainty with respect to our ownership of intellectual property and industry and market conditions generally. The potential collaborator may also consider alternative product candidates or technologies for similar indications that may be available to collaborate on and whether such a collaboration could be more attractive than the one with us for our product candidate.

Collaborations are complex and time-consuming to negotiate and document. In addition, there have been a significant number of recent business combinations among large pharmaceutical companies that have resulted in a reduced number of potential future collaborators. Even if we are successful in entering into a collaboration, the terms and conditions of that collaboration may restrict us from entering into future agreements on certain terms with potential collaborators.

If and when we seek to enter into collaborations, we may not be able to negotiate collaborations on a timely basis, on acceptable terms, or at all. If we are unable to do so, we may have to curtail the development of a product candidate, reduce or delay its development program or one or more of our other development programs, delay its potential commercialization or reduce the scope of any sales or marketing activities, or increase our expenditures and undertake development or commercialization activities at our own expense.

Our employees may engage in misconduct or other improper activities, including noncompliance with regulatory standards and requirements.

We are exposed to the risk of employee fraud or other misconduct. Misconduct by employees could include failures to comply with FDA regulations, provide accurate information to the FDA, comply with federal and state health care fraud and abuse laws and regulations, accurately report financial information or data or disclose unauthorized activities to us. In particular, sales, marketing and business arrangements in the health care industry are subject to extensive laws and regulations intended to prevent fraud, misconduct, kickbacks, self-dealing and other abusive practices. 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. Employee misconduct could also involve the improper use of information obtained in the course of clinical trials, which could result in regulatory sanctions and serious harm to our reputation. We have adopted a code of conduct, but it is not always possible to identify and deter employee misconduct, and the precautions we take to detect and prevent this activity may not be effective in controlling unknown or unmanaged risks or losses or in protecting us from governmental investigations or other actions or lawsuits stemming from a failure to comply with these laws or regulations. If any such actions are instituted against us, and we are not successful in defending ourselves or asserting our rights, those actions could have a significant impact on our business, including the imposition of significant fines or other sanctions.

Risks Related to Ownership of Our Common Stock

The market price of our stock may continue to be volatile, which could result in substantial losses for investors.

The trading price of our common stock has been, and is likely to continue to be, highly volatile and subject to wide fluctuations in response to various factors, some of which we cannot control. We priced our initial public offering at $18.00 per share on July 19, 2018, and our common stock reached a high of $112.87 per share during the fourth quarter of 2021. As of February 23, 2022, the closing price of our common stock was $5.44. The trading price of our common stock could be subject to wide fluctuations in response to various factors, which in addition to the factors discussed in this “Risk Factors” section and elsewhere in this Annual Report on Form 10-K, include:

- the timing and results of preclinical studies and clinical trials of our product candidates or those of our competitors;
- the success of competitive products or announcements by potential competitors of their product development efforts;
- regulatory actions with respect to our products or our competitors’ products;
- impacts and developments in the COVID-19 pandemic;
- actual or anticipated changes in our growth rate relative to our competitors;
- regulatory or legal developments in the United States and other countries;
- developments or disputes concerning patent applications, issued patents or other proprietary rights;
- the recruitment or departure of key scientific or management personnel;
- announcements by us or our competitors of significant acquisitions, strategic collaborations, joint ventures, collaborations or capital commitments;
- actual or anticipated changes in estimates as to financial results, development timelines or recommendations by securities analysts;
- fluctuations in the valuation of companies perceived by investors to be comparable to us;
- market conditions in the pharmaceutical and biotechnology sector;
- changes in the structure of healthcare payment systems;
- share price and volume fluctuations attributable to inconsistent trading volume levels of our shares;

- announcement or expectation of additional financing efforts;
- sales of our common stock by us, our insiders or our other stockholders;
- expiration of market stand-off or lock-up agreements; and
- general economic, industry and market conditions.

In addition, the stock market in general, and pharmaceutical and biotechnology companies in particular, have experienced extreme price and volume fluctuations that have often been unrelated or disproportionate to the operating performance of these companies, including in response to the COVID-19 pandemic. Broad market and industry factors may negatively affect the market price of our common stock, regardless of our actual operating performance. The realization of any of the above risks or any of a broad range of other risks, including those described in this "Risk Factors" section, could have a dramatic and adverse impact on the market price of our common stock.

Our operating results may fluctuate significantly, which makes our future operating results difficult to predict and could cause our operating results to fall below expectations or our guidance.

Our quarterly and annual operating results may fluctuate significantly in the future, which makes it difficult for us to predict our future operating results. From time to time, we may enter into license or collaboration agreements or strategic partnerships with other companies that include development funding and significant upfront and milestone payments and/or royalties, which may become an important source of our revenue. These upfront and milestone payments may vary significantly from period to period and any such variance could cause a significant fluctuation in our operating results from one period to the next.

In addition, we measure compensation cost for stock-based awards made to employees at the grant date of the award, based on the fair value of the award, and recognize the cost as an expense over the employee's requisite service period. As the variables that we use as a basis for valuing these awards change over time, including our underlying stock price and stock price volatility, the magnitude of the expense that we must recognize may vary significantly.

Furthermore, our operating results may fluctuate due to a variety of other factors, many of which are outside of our control and may be difficult to predict, including the following:

- delays or increased costs related to the COVID-19 global pandemic;
- the timing and cost of, and level of investment in, research and development activities relating to our current and any future product candidates, which will change from time to time;
- our ability to enroll patients in clinical trials and the timing of enrollment;
- the cost of manufacturing our current and any future product candidates, which may vary depending on FDA guidelines and requirements, the quantity of production and the terms of our agreements with manufacturers;
- expenditures that we will or may incur to acquire or develop additional product candidates and technologies;
- the timing and outcomes of clinical trials for lirentelimab and any of our future product candidates or competing product candidates;
- the need to conduct unanticipated clinical trials or trials that are larger or more complex than anticipated;
- competition from existing and potential future products that compete with lirentelimab and any of our future product candidates, and changes in the competitive landscape of our industry, including consolidation among our competitors or partners;
- any delays in regulatory review or approval of lirentelimab or any of our future product candidates;
- the level of demand for lirentelimab and any of our future product candidates, if approved, which may fluctuate significantly and be difficult to predict;

- the risk/benefit profile, cost and reimbursement policies with respect to our product candidates, if approved, and existing and potential future products that compete with lirentelimab and any of our future product candidates;
- our ability to commercialize lirentelimab and any of our future product candidates, if approved, inside and outside of the United States, either independently or working with third parties;
- our ability to establish and maintain collaborations, licensing or other arrangements;
- our ability to adequately support future growth;
- potential unforeseen business disruptions that increase our costs or expenses;
- future accounting pronouncements or changes in our accounting policies; and
- the changing and volatile global economic environment.

The cumulative effect of these factors could result in large fluctuations and unpredictability in our quarterly and annual operating results. As a result, comparing our operating results on a period-to-period basis may not be meaningful. Investors should not rely on our past results as an indication of our future performance. This variability and unpredictability could also result in our failing to meet the expectations of industry or financial analysts or investors for any period. If our revenue or operating results fall below the expectations of analysts or investors or below any forecasts we may provide to the market, or if the forecasts we provide to the market are below the expectations of analysts or investors, the price of our common stock could decline substantially. Such a stock price decline could occur even when we have met any previously publicly stated guidance we may provide.

Raising additional capital may restrict our operations or require us to relinquish rights to our technologies or product candidates, and if we sell shares of our common stock in future financings, stockholders may experience immediate dilution and, as a result, our stock price may decline.

Until such time, if ever, as we can generate substantial product revenues, we expect to finance our cash needs through a combination of equity offerings, debt financings, partnerships and marketing, distribution or licensing arrangements. We do not have any committed external source of funds. We may also from time to time issue additional shares of common stock at a discount from the then current trading price of our common stock. As a result, our stockholders would experience immediate dilution upon the purchase of any shares of our common stock sold at such discount. In addition, as opportunities present themselves, we may enter into financing or similar arrangements in the future, including the issuance of debt securities, preferred stock or common stock. If we issue common stock or securities convertible into common stock, our stockholders would experience additional dilution and, as a result, our stock price may decline. Debt financing, if available, may involve agreements that include covenants limiting or restricting our ability to take specific actions, such as incurring additional debt, making capital expenditures or declaring dividends.

If we raise additional funds through partnerships or marketing, distribution or licensing arrangements with third parties, we may have to relinquish valuable rights to our technologies, future revenue streams or product candidates or to grant licenses on terms that may not be favorable to us. If we are unable to raise additional funds through equity or debt financings when needed, we may be required to delay, limit, reduce or terminate our product development or future commercialization efforts or grant rights to develop and market product candidates that we would otherwise prefer to develop and market ourselves.

Our principal stockholders and management own a significant percentage of our stock and will be able to exert significant control over matters subject to stockholder approval.

As of December 31, 2021, our executive officers, directors, holders of 5% or more of our capital stock and their respective affiliates beneficially owned approximately 39.3% of our outstanding voting stock. As a result, this group of stockholders has the ability to significantly influence all matters requiring stockholder approval, including the election of directors, amendments of our organizational documents or approval of any merger, sale of assets or other major corporate transaction. This may prevent or discourage unsolicited acquisition proposals or offers for our common stock that you may feel are in your best interest as one of our stockholders. The interests of this group of stockholders may not always coincide with your interests or the interests of other stockholders and they may act in a

manner that advances their best interests and not necessarily those of other stockholders, including seeking a premium value for their common stock, and might affect the prevailing market price for our common stock.

We are currently and may in the future be subject to securities litigation, which is expensive and could divert management attention.

The market price of our common stock may be volatile and, in the past, companies that have experienced volatility in the market price of their stock have been subject to securities class action litigation. We are currently and may in the future be the target of this type of litigation. For example, on March 10, 2020, a putative securities class action complaint captioned Kim v. Allakos et al., No. 20-cv-01720 (N.D. Cal.) was filed in the United States District Court for the Northern District of California against us, our Chief Executive Officer, Dr. Robert Alexander, and our former Chief Financial Officer, Mr. Leo Redmond. The complaint asserts claims for violations of Sections 10(b) and 20(a) of the Securities Exchange Act of 1934 and Rule 10b-5 promulgated thereunder and seeks damages based on alleged material misrepresentations and omissions concerning our Phase 2 clinical trials of lirentelimab. The proposed class period is August 5, 2019, through December 17, 2019, inclusive. This or other securities litigation against us could result in substantial costs and divert our management's attention from other business concerns, which could seriously harm our business.

We have not paid and do not intend to pay dividends on our common stock so any returns will be limited to the value of our stock.

We have never declared or paid any cash dividends on our common stock. We currently anticipate that we will retain future earnings for the development, operation and expansion of our business and do not anticipate declaring or paying any cash dividends for the foreseeable future. Any return to stockholders will therefore be limited to any appreciation in the value of their stock.

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

Our amended and restated certificate of incorporation and amended and restated bylaws contain provisions that could depress the market price of our common stock by acting to discourage, delay or prevent a change in control of our company or changes in our management that the stockholders of our company may deem advantageous. These provisions, among other things:

- establish a classified board of directors so that not all members of our board are elected at one time;
- permit only the board of directors to establish the number of directors and fill vacancies on the board;
- provide that directors may only be removed “for cause” and only with the approval of two-thirds of our stockholders;
- authorize the issuance of “blank check” preferred stock that our board could use to implement a stockholder rights plan (also known as a “poison pill”);
- eliminate the ability of our stockholders to call special meetings of stockholders;
- prohibit stockholder action by written consent, which requires all stockholder actions to be taken at a meeting of our stockholders;
- prohibit cumulative voting;
- authorize our board of directors to amend the bylaws;
- establish advance notice requirements for nominations for election to our board or for proposing matters that can be acted upon by stockholders at annual stockholder meetings; and
- require a super-majority vote of stockholders to amend some provisions described above.

In addition, Section 203 of the General Corporation Law of the State of Delaware ("DGCL"), prohibits a publicly-held Delaware corporation from engaging in a business combination with an interested stockholder, generally a person which together with its affiliates owns, or within the last three years has owned, 15% of our voting stock, for a period of three years after the date of the transaction in which the person became an interested stockholder, unless the business combination is approved in a prescribed manner.

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

Our amended and restated certificate of incorporation provides that the Court of Chancery of the State of Delaware and the federal district courts of the United States of America will be the exclusive forums for substantially all disputes between us and our stockholders, which could limit our stockholders' ability to obtain a favorable judicial forum for disputes with us or our directors, officers or employees.

Our amended and restated certificate of incorporation provides that the Court of Chancery of the State of Delaware is the exclusive forum for:

- any derivative action or proceeding brought on our behalf;
- any action asserting a claim of breach of fiduciary duty;
- any action asserting a claim against us arising under the DGCL, our amended and restated certificate of incorporation or our amended and restated bylaws; and
- any action asserting a claim against us that is governed by the internal-affairs doctrine.

Our amended and restated certificate of incorporation further provides that the federal district courts of the United States of America will be the exclusive forum for resolving any complaint asserting a cause of action arising under the Securities Act (such provision, the "Federal Forum Provision"). However, on December 19, 2018, the Delaware Court of Chancery issued a decision in Matthew Sciabacucchi v. Matthew B. Salzberg et al., C.A. No. 2017-0931-JTL (Del. Ch.), finding that such provisions such as the Federal Forum Provision are not valid under Delaware law. In light of this decision of the Delaware Court of Chancery, we do not intend to enforce the federal forum provision in our amended and restated certificate of incorporation unless and until such time there is a final determination by the Delaware Supreme Court regarding the validity of such provisions. If the decision is not appealed or if the Delaware Supreme Court affirms the Delaware Chancery Court's decision, then we will seek approval by our stockholders to amend our certificate of incorporation at our next regularly-scheduled annual meeting of stockholders to remove the Federal Forum Provision.

These exclusive-forum provisions may limit a stockholder's ability to bring a claim in a judicial forum that it finds favorable for disputes with us or our directors, officers or other employees, which may discourage lawsuits against us and our directors, officers and other employees. If a court were to find either exclusive-forum provision in our amended and restated certificate of incorporation to be inapplicable or unenforceable in an action, we may incur additional costs associated with resolving the dispute in other jurisdictions, which could seriously harm our business.

General Business Risks

If we fail to comply with environmental, health and safety laws and regulations, we could become subject to fines or penalties or incur costs that could have a material adverse effect on our business.

We are subject to numerous environmental, health and safety laws and regulations, including those governing laboratory procedures and the handling, use, storage, treatment and disposal of hazardous materials and wastes. Our operations involve the use of hazardous and flammable materials, including chemicals and biological materials. Our operations also produce hazardous waste products. We generally contract with third-parties for the disposal of these materials and wastes. We cannot eliminate the risk of contamination or injury from these materials. In the event of contamination or injury resulting from our use of hazardous materials, we could be held liable for any resulting

damages, and any liability could exceed our resources. We also could incur significant costs associated with civil or criminal fines and penalties.

Although we maintain workers' compensation insurance to cover us for costs and expenses we may incur due to injuries to our employees resulting from the use of hazardous materials, this insurance may not provide adequate coverage against potential liabilities. We do not maintain insurance for environmental liability or toxic tort claims that may be asserted against us in connection with our storage or disposal of hazardous and flammable materials, including chemicals and biological materials.

In addition, we may incur substantial costs in order to comply with current or future environmental, health and safety laws and regulations. These current or future laws and regulations may impair our research, development or commercialization efforts. Failure to comply with these laws and regulations also may result in substantial fines, penalties or other sanctions.

Our business activities may be subject to the Foreign Corrupt Practices Act ("FCPA"), the UK Bribery Act 2010 ("UK Bribery Act"), and other similar anti-bribery and anti-corruption laws of other countries in which we operate.

We have conducted and have ongoing studies in international locations, and may in the future initiate additional studies in countries other than the U.S. Our business activities may be subject to the FCPA, the UK Bribery Act and other similar anti-bribery or anti-corruption laws, regulations or rules of other countries in which we operate. The FCPA generally prohibits offering, promising, giving or authorizing others to give anything of value, either directly or indirectly, to a non-U.S. government official in order to influence official action or otherwise obtain or retain business. The FCPA also requires public companies to make and keep books and records that accurately and fairly reflect the transactions of the corporation and to devise and maintain an adequate system of internal accounting controls. Our business is heavily regulated and therefore involves significant interaction with public officials, including officials of non-U.S. governments. Additionally, in many other countries, the health care providers who prescribe pharmaceuticals are employed by their government, and the purchasers of pharmaceuticals are government entities; therefore, our dealings with these prescribers and purchasers are subject to regulation under the FCPA. Recently the SEC and Department of Justice have increased their FCPA enforcement activities with respect to biotechnology and pharmaceutical companies. There is no certainty that all of our employees, agents or contractors, or those of our affiliates, will comply with all applicable laws and regulations, particularly given the high level of complexity of these laws. Violations of these laws and regulations could result in fines, criminal sanctions against us, our officers or our employees, the closing down of our facilities, requirements to obtain export licenses, cessation of business activities in sanctioned countries, implementation of compliance programs and prohibitions on the conduct of our business. Any such violations could include prohibitions on our ability to offer our products in one or more countries and could materially damage our reputation, our brand, our international expansion efforts, our ability to attract and retain employees and our business, prospects, operating results and financial condition.

We may experience disruptions and delays or incur financial damages as a result of system failures or security breaches.

Despite the implementation of security measures, any of the internal computer systems belonging to us or our third-party service providers are vulnerable to damage from computer viruses, unauthorized access, natural disasters, terrorism, war and telecommunication and electrical failure. Any system failure, accident or security breach that causes interruptions in our own or in third-party service providers' operations could result in a material disruption of our drug discovery and development programs. A system failure or security breach that causes the loss of clinical trial data from completed or future clinical trials could result in delays in our regulatory approval efforts and significantly increase our costs in order to recover or reproduce the lost data. In addition, to the extent that any disruption or security breach results in a loss or damage to our data or applications, or inappropriate disclosure of confidential or proprietary information, we may incur liability as a result, our drug discovery programs and competitive position may be adversely affected, and further development of our product candidates may be delayed. Any such disruption, failure or security breach could also cause us to incur additional costs to remedy the damages that arise from such disruption, failure or security breach.

Our insurance policies may not be adequate to compensate us for the potential losses arising from any such disruption, failure or security breach. In addition, such insurance may not be available to us in the future on

economically reasonable terms, or at all. Further, our insurance may not cover all claims made against us and could have high deductibles in any event, and defending a suit, regardless of its merit, could be costly and divert management attention.

If we engage in future acquisitions or strategic partnerships, this may increase our capital requirements, dilute our stockholders, cause us to incur debt or assume contingent liabilities, and subject us to other risks.

We may evaluate various acquisition opportunities and strategic partnerships, including licensing or acquiring complementary products, intellectual property rights, technologies or businesses. Any potential acquisition or strategic partnership may entail numerous risks, including:

- increased operating expenses and cash requirements;
- the assumption of additional indebtedness or contingent liabilities;
- the issuance of our equity securities;
- assimilation of operations, intellectual property and products of an acquired company, including difficulties associated with integrating new personnel;
- the diversion of our management's attention from our existing product programs and initiatives in pursuing such a strategic merger or acquisition;
- retention of key employees, the loss of key personnel and uncertainties in our ability to maintain key business relationships;
- risks and uncertainties associated with the other party to such a transaction, including the prospects of that party and their existing products or product candidates and marketing approvals; and
- our inability to generate revenue from acquired technology and/or products sufficient to meet our objectives in undertaking the acquisition or even to offset the associated acquisition and maintenance costs.

In addition, if we undertake acquisitions, we may issue dilutive securities, assume or incur debt obligations, incur large one-time expenses and acquire intangible assets that could result in significant future amortization expense. Moreover, we may not be able to locate suitable acquisition opportunities, and this inability could impair our ability to grow or obtain access to technology or products that may be important to the development of our business.

If securities or industry analysts do not publish research or reports about our business, or if they issue an adverse or misleading opinion regarding our stock, our stock price and trading volume could decline.

The trading market for our common stock is influenced by the research and reports that industry or securities analysts publish about us or our business. If any of the analysts covering us issue an adverse or misleading opinion regarding us, our business model, our intellectual property or our stock performance, or if our operating results fail to meet the expectations of analysts, our stock price would likely decline. In addition, if one or more of these analysts cease coverage of us or fail to publish reports on us regularly, we could lose visibility in the financial markets, which in turn could cause our stock price or trading volume to decline.

Our disclosure controls and procedures may not prevent or detect all errors or acts of fraud.

We are subject to the periodic reporting requirements of the Securities Exchange Act of 1934, as amended ("Exchange Act"). We designed our disclosure controls and procedures to reasonably assure that information we must disclose in reports we file or submit under the Exchange Act is accumulated and communicated to management, and recorded, processed, summarized and reported within the time periods specified in the rules and forms of the SEC. We believe that any disclosure controls and procedures or internal controls and procedures, no matter how well-conceived and operated, can provide only reasonable, not absolute, assurance that the objectives of the control system are met.

These inherent limitations include the facts that judgments in decision-making can be faulty and that breakdowns can occur because of simple error or mistake. Additionally, controls can be circumvented by the individual acts of some persons, by collusion of two or more people or by an unauthorized override of the controls. Accordingly, because of the inherent limitations in our control system, misstatements due to error or fraud may occur and not be detected.

Our operations are vulnerable to interruption by fire, earthquake, power loss, telecommunications failure, terrorist activity and other events beyond our control, which could harm our business.

Our facility is located in a seismically active region and in a state which also experiences large scale wildfires from time to time. We have not undertaken a systematic analysis of the potential consequences to our business and financial results from a major earthquake, fire, power loss, terrorist activity or other disasters and do not have a recovery plan for such disasters. In addition, we are in the process of constructing a new office and laboratory facility in San Carlos, California pursuant to a lease agreement we entered into in December 2019. We may encounter difficulties and delays in construction as well as in obtaining necessary validation, permits, licenses, and certifications for this facility. For example, as circumstances around the COVID-19 pandemic are evolving, government-imposed quarantines and restrictions may require us to temporarily halt construction or validation activities. Furthermore, we may not be able to fully occupy this facility on our currently anticipated timeline, which could negatively impact our financial results given the fixed costs associated with the lease. If we are unable to complete construction in a timely and satisfactory manner, obtain the necessary permits, licenses, certificates, and accreditations or fully occupy this facility, we may be unable to meet our currently anticipated development timelines for our product candidates, which would negatively impact our reputation, commercial plans and results of operations.

In addition, we do not carry sufficient insurance to compensate us for actual losses from interruption of our business that may occur, and any losses or damages incurred by us could harm our business. We maintain multiple copies of each of our antibody sequences and electronic data records, most of which we maintain at our headquarters. If our facility were impacted by a seismic event, we could lose all our antibody sequences, which would have an adverse effect on our ability to discover new targets.

Our ability to utilize our net operating loss carryforwards and certain other tax attributes may be limited.

As of December 31, 2021, we had gross U.S. federal and state net operating loss carryforwards of $715.5 million and $95.1 million, respectively. Federal net operating loss carryforwards of $653.6 million, which were generated after December 31, 2017, do not expire. The remaining $61.9 million of federal net operating loss carryforwards expire beginning in 2032. It is possible that we will not generate taxable income in time to use our net operating loss carryforwards before their expiration (if applicable) or at all. Under Sections 382 and 383 of the Internal Revenue Code of 1986, as amended, if a corporation undergoes an “ownership change” (generally defined as a greater than 50 percentage points change (by value) in the ownership of its equity over a rolling three-year period), the corporation’s ability to use its pre-change net operating loss carryforwards and certain other pre-change tax attributes to offset its post-change income and taxes may be limited. We may have experienced such ownership changes in the past, and we may experience ownership changes in the future as a result of shifts in our stock ownership, some of which are outside our control. Accordingly, our ability to utilize our net operating loss carryforwards and certain other tax attributes could be limited by an “ownership change” as described above, which could result in increased tax liability to our company.

Item 1B. Unresolved Staff Comments.

None.

Item 2. Properties.

Our corporate headquarters are currently located in Redwood City, California, where we lease 25,136 square feet of office, research and development and laboratory space pursuant to a lease agreement that expires on April 30, 2022.

On December 4, 2019, we entered into a lease agreement for approximately 98,000 square feet of office space to be constructed in San Carlos, California. These premises were delivered in November 2020, and we expect to move into this new headquarters in March 2022. The lease term will expire 123 months on October 31, 2031. This lease agreement includes an option to extend the term for an additional period of five years and provides us a right of first refusal for certain additional office space.

We believe that our facilities will be sufficient for our needs over the next twelve months. We may need additional space as we expand our business and believe that additional space when needed, will be available on commercially reasonable terms.

Item 3. Legal Proceedings.

From time to time, we may become involved in litigation or other legal proceedings. On March 10, 2020, a putative securities class action complaint captioned Kim v. Allakos et al., No. 20-cv-01720 (N.D. Cal.) was filed in the United States District Court for the Northern District of California against us, our Chief Executive Officer, Dr. Robert Alexander, and our former Chief Financial Officer, Mr. Leo Redmond. The complaint asserts claims for violations of Sections 10(b) and 20(a) of the Securities Exchange Act of 1934 and Rule 10b-5 promulgated thereunder and seeks damages based on alleged material misrepresentations and omissions concerning its Phase 2 clinical trials of lirentelimab. The proposed class period is August 5, 2019, through December 17, 2019, inclusive. On August 28, 2020, the plaintiff filed an amended complaint, adding as defendants Dr. Adam Tomasi, our President, Chief Operating Officer and then Chief Financial Officer, and Dr. Henrik Rasmussen, our then Chief Medical Officer. Defendants filed a motion to dismiss the lawsuit in November 2020, which is fully briefed and pending a decision from the Court. Given the early stage of this litigation matter, we cannot reasonably estimate a potential future loss or a range of potential future losses and have not recorded a contingent liability accrual as of December 31, 2021.

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 has been listed on the NASDAQ Global Select Market under the symbol "ALLK".

Holders of Common Stock

As of February 23, 2022, there were 20 holders of record of our common stock. Because many of our shares of common stock are held by brokers and other institutions on behalf of stockholders, we are unable to estimate the total number of beneficial owners of our common stock represented by these record holders.

Dividend Policy

We have never declared or paid any cash dividends on our common stock or any other securities. We anticipate that we will retain all available funds and any future earnings, if any, for use in the operation of our business and do not anticipate paying cash dividends in the foreseeable future. In addition, future debt instruments may materially restrict our ability to pay dividends on our common stock. Payment of future cash dividends, if any, will be at the discretion of the board of directors after taking into account various factors, including our financial condition, operating results, current and anticipated cash needs, the requirements of current or then-existing debt instruments and other factors the board of directors deems relevant.

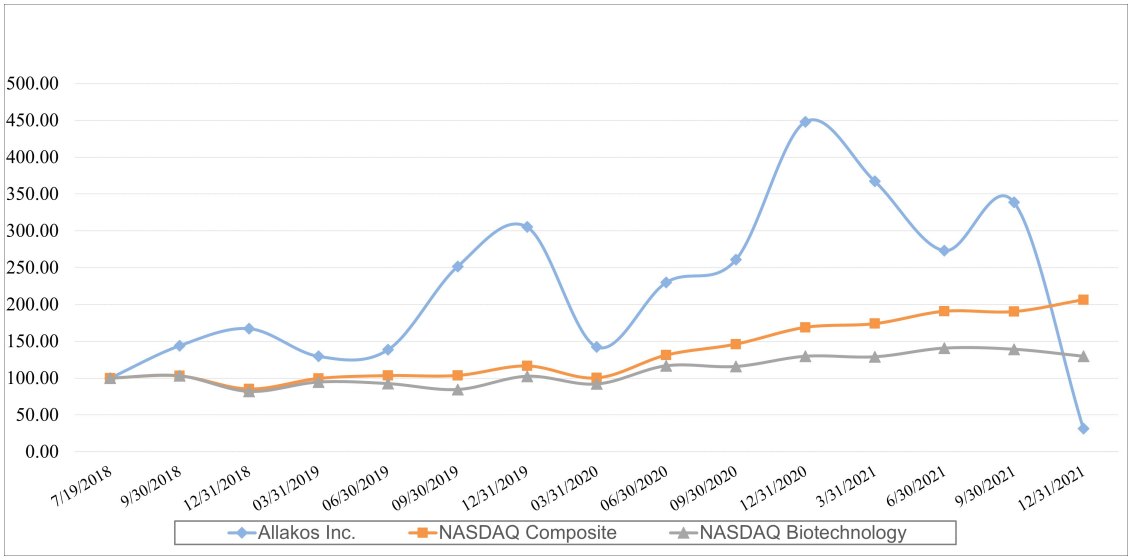
Performance Graph

This graph below is not "soliciting material" or deemed "filed" with the SEC for purposes of Section 18 of the Exchange Act, or otherwise subject to liabilities under that Section, and shall not be deemed incorporated by reference into this Annual Report on Form 10-K or into any other filing of Allakos Inc. under the Securities Act, as amended, except to the extent that we specifically incorporate this information by reference therein, whether made before or after the date hereof and irrespective of any general incorporation language in any such filing.

The following graph compares the cumulative total return to stockholder return on our common stock relative to the cumulative total returns of the NASDAQ Composite Index and the NASDAQ Biotechnology Index. An investment of $100 is assumed to have been made in our common stock and each index on July 19, 2018 (the first day of trading of our common stock) and its relative performance is tracked through December 31, 2021. Pursuant to applicable Securities and Exchange Commission rules, all values assume reinvestment of the full amount of all dividends, however no dividends have been declared on our common stock to date. The stockholder returns shown on

the graph below are based on historical results and are not indicative of future performance, and we do not make or endorse any predictions as to future stockholder returns.

COMPARISON OF CUMULATIVE TOTAL RETURN
among Allakos Inc., the NASDAQ Composite Index
and the NASDAQ Biotechnology Index



	7/19/2018	9/30/2018	12/31/2018	3/31/2019	6/30/2019	9/30/2019	12/31/2019	3/31/2020	6/30/2020	9/30/2020	12/31/2020	3/31/2020 21	6/30/2021	9/30/2021	12/31/2021
Allakos Inc.	$ 100.00	$ 143.97	$ 167.26	$ 129.60	$ 138.66	$ 251.62	$ 305.15	$ 142.37	$ 229.95	$ 260.64	$ 448.00	$ 367.30	$ 273.18	$ 338.78	$ 31.33
NASDAQ Composite	100.00	103.06	85.24	99.56	103.42	103.60	116.51	100.26	131.28	146.03	168.85	173.84	190.66	190.23	206.30
NASDAQ Biotechnology	100.00	103.09	81.92	94.65	92.52	84.54	102.49	91.96	116.70	115.74	129.57	128.86	140.65	139.14	129.60

Recent Sales of Unregistered Securities

Not applicable

Use of Proceeds from Registered Securities

Not applicable

Issuer Purchases of Equity Securities

Not applicable

Item 6. [Reserved]

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

You should read the following discussion and analysis of our financial condition and results of operations together with our financial statements and the other financial information appearing elsewhere in this Annual Report on Form 10-K. These statements generally relate to future events or to our future financial performance and involve known and unknown risks, uncertainties and other factors which may cause our actual results, performance or achievements to be materially different from any future results, performance or achievements expressed or implied by the forward-looking statements. The following discussion and analysis contain forward-looking statements within the meaning of the Private Securities Litigation Reform Act of 1995. Our actual results and the timing of events may differ materially from those discussed in our forward-looking statements as a result of various factors, including those discussed below and those discussed in the section entitled "Risk Factors" included in this Annual Report on Form 10-K. If we do update one or more forward-looking statements, no inference should be drawn that we will make additional updates with respect to those or other forward-looking statements. Additional information concerning these and other risks and uncertainties is contained in our other periodic filings with the SEC.

Forward-looking statements include, but are not limited to, statements about:

- *risks related to the COVID-19 pandemic;*
- *our plans and ability to manufacture, or have manufactured, sufficient quantities of lirentelimab for preclinical studies and to conduct clinical trials and to eventually commercialize the product, and our reliance on third parties in relation to the foregoing;*
- *the impact that the adoption of new accounting pronouncements will have on our financial statements;*
- *the ability of our clinical trials to demonstrate safety and efficacy of our product candidates, and other positive results;*
- *the timing and focus of our future clinical trials, and the reporting of data from those trials;*
- *our plans relating to commercializing lirentelimab, if approved, including the geographic areas of focus and sales strategy;*
- *the size of the market opportunity for lirentelimab in each of the diseases we are targeting;*
- *the number of diseases represented in the patient population enrolled in our clinical trials, and our ability to evaluate response to treatment of lirentelimab in diseases other than the primary indication in our clinical trials;*
- *our estimates of the number of patients in the United States who suffer from the diseases we are targeting and the number of patients that will enroll in our clinical trials;*
- *the beneficial characteristics, safety, efficacy and therapeutic effects of lirentelimab;*
- *the timing or likelihood of regulatory filings and approvals, including our expectation to seek special designations, such as orphan drug designation, for lirentelimab or our other product candidates for various diseases;*
- *our ability to obtain and maintain regulatory approval of lirentelimab or our other product candidates;*
- *our plans relating to the further development of lirentelimab and our other product candidates;*
- *existing regulations and regulatory developments in the United States and other jurisdictions;*
- *our plans and ability to obtain or protect intellectual property rights, including extensions of existing patent terms where available;*
- *our continued reliance on third-parties to conduct additional clinical trials of lirentelimab and our other product candidates;*
- *the need to hire additional personnel and our ability to attract and retain such personnel;*
- *the accuracy of our estimates regarding expenses, future revenue, capital requirements and needs for additional financing;*

- *our financial performance;*
- *the sufficiency of our existing cash, cash equivalents and marketable securities to fund our future operating expenses and capital expenditure requirements; and*
- *our anticipated uses of our existing cash, cash equivalents and investments in marketable securities.*

These forward-looking statements are subject to a number of risks, uncertainties, and assumptions, including, but not limited to, those described in "Risk Factors." In some cases, you can identify these statements by terms such as "anticipate," "believe," "could," "estimate," "expects," "intend," "may," "plan," "potential," "predict," "project," "should," "will," "would" or the negative of those terms, and similar expressions that convey uncertainty of future events or outcomes. These forward-looking statements reflect our beliefs and views with respect to future events and are based on estimates and assumptions as of the date of this Annual Report on Form 10-K and are subject to risks and uncertainties. We discuss many of these risks in greater detail in the section entitled "Risk Factors" included in Part I, Item 1A and elsewhere in this Report. Moreover, we operate in a very competitive and rapidly changing environment. New risks emerge from time to time. It is not possible to predict all risks, nor can we assess the impact of all factors on our business or the extent to which any factor, or combination of factors, may cause actual results to differ materially from those contained in any forward-looking statements we may make. Given these uncertainties, you should not place undue reliance on these forward-looking statements. We qualify all of the forward-looking statements in this Annual Report on Form 10-K by these cautionary statements. Except as required by law, we assume no obligation to update these forward-looking statements publicly, or to update the reasons actual results could differ materially from those anticipated in any forward-looking statements, whether as a result of new information, future events or otherwise.

Our discussion and analysis below are focused on our financial results and liquidity and capital resources for the years ended December 31, 2021 and 2020, including year-over-year comparisons of our financial performance and condition for these years. Discussion and analysis of the year ended December 31, 2019 specifically, as well as the year-over-year comparison of our financial performance and condition for the years ended December 31, 2020 and 2019, are located in Part II, Item 7 - Management's Discussion and Analysis of Financial Condition and Results of Operations in our Annual Report on Form 10-K for the year ended December 31, 2020, filed with the SEC on March 1, 2021.

Overview

We are a clinical stage biotechnology company developing therapeutics which target immunomodulatory receptors present on immune effector cells involved in allergy, inflammatory and proliferative diseases. Our most advanced antibodies are lirentelimab (AK002) and AK006. Lirentelimab targets Siglec-8, an inhibitory receptor expressed selectively on eosinophils and mast cells. Lirentelimab has been studied in a number of human clinical studies and has shown the ability to deplete eosinophils inhibit mast cell activation, and improve patient reported symptoms. We are developing lirentelimab for the treatment of eosinophilic gastritis/eosinophilic duodenitis, eosinophilic esophagitis, atopic dermatitis, chronic spontaneous urticaria and potentially additional indications. AK006 targets Siglec-6, an inhibitory receptor selectively expressed on mast cells. AK006 appears to have the potential to provide deeper mast cell inhibition than lirentelimab and, in addition to its inhibitory activity, reduce mast cell numbers. We plan to begin human studies with AK006 in the first half of 2023.

Lirentelimab selectively targets both mast cells and eosinophils, two types of white blood cells that are widely distributed in the body and play a central role in the inflammatory response. Inappropriately activated mast cells and eosinophils have been identified as key drivers in a number of severe diseases affecting the gastrointestinal tract, eyes, skin, lungs and other organs. Our initial focus is on eosinophilic gastrointestinal diseases which include eosinophilic esophagitis ("EoE"), eosinophilic gastritis ("EG") as well as eosinophilic duodenitis ("EoD") which has also been referred to as eosinophilic gastroenteritis. In addition, lirentelimab is being tested in atopic dermatitis and chronic spontaneous urticaria and has the potential to treat a number of other severe diseases. To date, lirentelimab completed a randomized, double-blind, placebo-controlled Phase 2 study (ENIGMA 1) and Phase 3 study (ENIGMA 2) in patients with EG and/or EoD, a Phase 2/3 study in patients with EoE (KRYPTOS), as well as proof of concept studies in chronic spontaneous urticaria, severe allergic conjunctivitis, and indolent systemic mastocytosis. Lirentelimab has received orphan disease status for EG, EoD, and EoE from the U.S. Food and Drug Administration (the "FDA").

The Phase 2 EG and/or EoD study with lirentelimab (ENIGMA 1) met all prespecified primary and secondary endpoints when compared to placebo and results were published in The New England Journal of Medicine. Additionally, patients in the ENIGMA 1 study with co-morbid EoE showed histologic and symptomatic improvement when treated with lirentelimab compared to placebo. More recently, topline data from Phase 3 ENIGMA 2 and Phase 2/3 KRYPTOS studies of lirentelimab were announced in the fourth quarter of 2021. The ENIGMA 2 study met the histologic co-primary endpoint but missed the symptomatic co-primary endpoint when compared to placebo. Similarly, the KRYPTOS study met the histologic co-primary endpoint but missed the symptomatic co-primary endpoint when compared to placebo. Upon full analysis, we believe that the trials missed their symptomatic co-primary endpoints due to the inclusion of mild patients and/or patients who had not failed standard of care. In the more severe populations, clear signs of efficacy were observed in both EG/EoD and EoE patients. Based on these findings, we plan to conduct additional studies with lirentelimab in these indications after discussions with the FDA

Despite the knowledge that mast cells and eosinophils drive many pathological conditions, there are no approved therapies that selectively target both mast cells and eosinophils. Lirentelimab binds to Siglec-8, an inhibitory receptor found on mast cells and eosinophils, which represents a novel mechanism to selectively inhibit or deplete these important immune cells and thereby potentially resolve inflammation. We believe lirentelimab is the only Siglec-8 targeting antibody currently in clinical development.

Since our inception in 2012, we have devoted substantially all of our resources and efforts towards the research and development of our product candidates. Our lead product candidate, lirentelimab, a monoclonal antibody targeting Siglec-8, entered clinical trials in 2016. In addition to activities conducted internally at our facilities, we have utilized significant financial resources to engage contractors, consultants and other third parties to conduct various preclinical and clinical development activities on our behalf.

To date, we have not had any products approved for sale and have not generated any revenue nor been profitable. Further, we do not expect to generate revenue from product sales until such time, if ever, that we are able to successfully complete the development and obtain marketing approval for one of our product candidates. We will continue to require additional capital to develop our product candidates and fund operations for the foreseeable future. We have incurred significant operating losses to date and expect to incur significant operating losses for the foreseeable future. Our net losses were $269.9 million and $153.5 million for the years ended December 31, 2021 and 2020, respectively. As of December 31, 2021, we had an accumulated deficit of $612.8 million.

In February 2022, we began implementing a reorganization plan (the “Reorganization Plan”) to reduce operating costs, contractual commitments and better align our workforce with the clinical development plans of our business. As a result, we entered into the Termination Agreement with Lonza and reduced our workforce by approximately 35%. While this will result in increased near-term costs, primarily in the first and second quarters of 2022, we believe that the Reorganization Plan will reduce our overall spending in subsequent quarters subject to periodic fluctuations caused by the timing of ongoing manufacturing development efforts. Refer to Note 12 “Subsequent Events” of our financial statements for additional information.

As of December 31, 2021, we had cash, cash equivalents and marketable securities of $424.2 million, which we believe will be sufficient to fund our planned operations for at least the next 12 months from the issuance of our financial statements.

In-Licensing Agreements

We have entered into a number of exclusive and nonexclusive, royalty bearing license agreements with third-parties for certain intellectual property. Under the terms of the license agreements described below, we are obligated to pay milestone payments upon the achievement of specified clinical, regulatory and commercial milestones. Research and development expense associated with the Company’s milestone payments are recognized when such milestone has been achieved. Actual amounts due under the license agreements vary depending on factors including, but not limited to, the number of product candidates we develop and our ability to successfully develop and commercialize our product candidates covered under the respective agreements. In addition to milestone payments, we are also subject to future royalty payments based on sales of our product candidates covered under the agreements, as well as certain minimum annual royalty and commercial reservation fees. Because the achievement of milestones

and the timing and extent of future royalties is not probable, these contingent amounts have not been included on our balance sheets or as part of Contractual Obligations and Commitments discussion below.

We did not incur any milestone expense for the year ended December 31, 2021. We incurred $3.4 million of milestone expense for the year ended December 31, 2020 related to development milestones associated with the first patient dosed in our Phase 3 study with lirentelimab. Milestone payments are not creditable against royalties. As of December 31, 2021, we have not incurred any royalty liabilities related to our license agreements, as product sales have not yet commenced.

Exclusive License Agreement with The Johns Hopkins University

In December 2013, we entered into a license agreement with JHU for a worldwide exclusive license to develop, use, manufacture and commercialize covered product candidates including lirentelimab, which was amended in September 2016. Under the terms of the agreement, we have made upfront and milestone payments of $0.7 million through December 31, 2021 and we may be required to make aggregate additional milestone payments of up to $1.8 million. We also issued 88,887 shares of common stock as consideration under the JHU license agreement. In addition to milestone payments, we are also subject to low single-digit royalties to JHU based on future net sales of each licensed therapeutic product candidate by us and our affiliates and sublicensees, with up to a low six-digit dollar minimum annual royalty payment.

Non-exclusive License Agreement with BioWa Inc. and Lonza Sales AG

In October 2013, we entered into a tripartite agreement with BioWa and Lonza for the non-exclusive worldwide license to develop and commercialize product candidates including lirentelimab that are manufactured using a technology jointly developed and owned by BioWa and Lonza. Under the terms of the agreement, we have made milestone payments of $3.4 million through December 31, 2021 and we may be required to make aggregate additional milestone payments of up to $38.0 million. In addition to milestone payments, we are also subject to minimum annual commercial license fees of $40,000 per year to BioWa until such time as BioWa receives royalty payments, as well as low single-digit royalties to BioWa and to Lonza. Royalties are based on future net sales by us and our affiliates and sublicensees.

Results of Operations

The following table summarizes our results of operations for the periods indicated (in thousands):

	Year Ended December 31,		
	2021	2020	2019
Operating expenses			
Research and development	$ 196,328	$ 105,533	$ 61,858
General and administrative	75,147	51,524	29,560
Total operating expenses	271,475	157,057	91,418
Loss from operations	(271,475)	(157,057)	(91,418)
Interest income	377	4,313	6,201
Other income (expense), net	1,238	(736)	(155)
Net loss	(269,860)	(153,480)	(85,372)
Unrealized gain (loss) on marketable securities	(161)	(129)	152
Comprehensive loss	$ (270,021)	$ (153,609)	$ (85,220)

Comparison of the Years Ended December 31, 2021 and 2020

Research and Development Expenses

Research and development expenses consist primarily of discovery, development and manufacturing of our non-commercial products, clinical trial costs (including payments to contract research organizations, or “CROs”), salaries and other personnel costs, preclinical study fees, research supply costs, facility and equipment costs and allocations of facilities and other overhead costs. Amounts incurred in connection with license agreements, including milestone payments, are also included in research and development expense.

We expense research and development costs as incurred. We recognize costs for certain development activities, such as clinical trials, based on an evaluation of the progress to completion of specific tasks using data such as clinical site activations, patient enrollment or information provided to us by our clinical CROs and clinical investigative sites, along with analysis by our in-house clinical operations personnel. Advance payments for goods or services to be received in the future for use in research and development activities are deferred and capitalized as prepaid expenses, even when there is no alternative future use for the research and development. The capitalized amounts are expensed as the related goods are delivered or the services are performed.

Prior to the regulatory approval of our product candidates, we recognize expenses incurred with our CDMOs for the manufacture of product candidates that could potentially be available to support future commercial sales, if approved, in the period in which they have occurred. To date, we have not yet capitalized any costs to inventory as we are unable to determine if these costs will provide a future economic benefit, given the unapproved nature of our product candidates.

The successful development of our product candidates is highly uncertain. Accordingly, it is difficult to estimate the nature, timing and extent of costs necessary to complete the remainder of the development of our product candidates. We are also unable to predict when, if ever, we will be able to generate revenue from our product candidates. This is due to the numerous risks and uncertainties associated with developing drugs, including the uncertainty surrounding:

- demonstrating sufficient safety and tolerability profiles of product candidates;
- successful enrollment and completion of clinical trials;
- requisite clearance and approvals from applicable regulatory authorities;
- establishing and maintaining commercial manufacturing capabilities with CDMOs;
- obtaining and maintaining protection of intellectual property; and
- commercializing product candidates, if and when approved, alone or in collaboration with third-parties.

A change pertaining to any of these variables would significantly impact the timing and extent of costs incurred with respect to the development and commercialization of our product candidates.

External costs incurred from CDMOs, clinical CROs and clinical investigative sites have comprised a significant portion of our research and development expenses since inception. We track these costs on a program-by-program basis following the advancement of a product candidate into clinical development. Consulting and personnel-related costs, laboratory supplies and non-capital equipment utilized in the conduct of in-house research, in-licensing fees and general overhead, are not tracked on a program-by-program basis, nor are they allocated, as they commonly benefit multiple projects, including those still in our pipeline.

The following table summarizes our research and development expenses for the periods indicated (in thousands):

	Year Ended December 31,		
	2021	2020	2019
Lirentelimab contract research and development costs	$ 117,621	$ 55,322	$ 30,806
Consulting and personnel-related costs	60,974	37,560	23,967
Other unallocated research and development costs	17,733	12,651	7,085
Total	$ 196,328	$ 105,533	$ 61,858

Research and development expenses were $196.3 million for the year ended December 31, 2021 compared to $105.5 million for the year ended December 31, 2020, an increase of $90.8 million. The period-over-period increase in research and development expenses is primarily driven by an additional $62.3 million of lirentelimab contract research and development costs as a result of increased spending to support the manufacturing of lirentelimab and additional clinical trials costs, $23.4 million of consulting and personnel-related costs primarily associated with increased headcount and includes $8.3 million of increased stock-based compensation expense, and $5.1 million increase in other unallocated research and development costs primarily related to increased facilities and overhead costs.

We anticipate that our research and development expenses will increase significantly during the first and second quarters of 2022 due to the Termination Agreement with Lonza as well as employment severance and retention related costs associated with the Reorganization Plan. We believe that the Reorganization Plan will reduce our overall spending, excluding stock-based compensation, in subsequent quarters subject to periodic fluctuations caused by the timing of ongoing manufacturing development efforts.

General and Administrative Expenses

General and administrative expenses consist of fees paid to consultants, salaries, benefits and other personnel-related costs, including stock-based compensation, for our personnel in executive, finance, accounting and other administrative functions, legal costs, fees paid for accounting and tax services, costs associated with pre-commercialization activities and facility costs not otherwise included in research and development expenses. Legal costs include general corporate and patent legal fees and related costs.

General and administrative expenses were $75.1 million for the year ended December 31, 2021 compared to $51.5 million for the year ended December 31, 2020, an increase of $23.6 million. The period-over-period increase in general and administrative expenses was primarily attributable to an increase of $16.2 million in increased personnel-related costs due to increased headcount and includes an increase of $9.1 million in stock-based compensation expense. Other period-over-period changes included increases to G&A outside spend of $4.0 million related to legal costs, accounting and financial service costs, and costs incurred by our early commercial development efforts. Finally, we incurred incremental facilities and other administrative costs of $3.4 million not otherwise allocated to research and development expenses.

We anticipate that our general and administrative expenses will increase during the first quarter of 2022 due to the employment severance and retention related costs associated with the Reorganization Plan. We believe that the Reorganization Plan will reduce our overall spending, excluding stock-based compensation, in subsequent quarters. Additionally, we expect to continue to incur costs associated with continuing to operate as a public company, including expenses related to maintaining compliance with the rules and regulations of the SEC, and those of any national securities exchange on which our securities are traded, additional insurance premiums, information technology and facility activities, and other ancillary administrative and professional services.

Interest Income

Interest income was $0.4 million for the year ended December 31, 2021 compared to $4.3 million for the year ended December 31, 2020, a decrease of $3.9 million. The year-over-year decrease is primarily attributable to lower interest rates and lower investment balances held during the current year.

Other Income (Expense), Net

Other income (expense), net, for the year ended December 31, 2021 reflected a gain of $1.2 million compared to a loss of $0.7 million for the year ended December 31, 2020. Other income (expense), net, for the year ended December 31, 2021 included a $1.9 million gain as a result of the lease modification entered into in November 2021 which was partially offset by fluctuations in foreign currency rates.

Liquidity and Capital Resources

Sources of Liquidity

As of December 31, 2021, we had cash, cash equivalents and marketable securities of $424.2 million. Based on our existing business plan, we believe that our current cash, cash equivalents and marketable securities will be sufficient to fund our anticipated level of operations through at least the next 12 months from the issuance of our financial statements.

We are a clinical stage biotechnology company with a limited operating history. As a result of our significant research and development expenditures, we have generated net losses since our inception. We have financed our operations primarily through equity offerings.

July 2018 Initial Public Offering

On July 23, 2018, we completed an IPO, selling 8,203,332 shares of common stock at $18.00 per share (the "July 2018 IPO"). Proceeds from our July 2018 IPO, net of underwriting discounts and commissions, were $137.3 million. Concurrently with our July 2018 IPO, we completed a private placement of 250,000 shares of common stock at $18.00 per share to an existing stockholder. Proceeds from this private placement were $4.5 million.

In connection with the completion of the July 2018 IPO, all then outstanding shares of convertible preferred stock converted into 30,971,627 shares of common stock.

August 2019 Follow-On Offering

On August 9, 2019, we closed an underwritten public offering (the "August 2019 Offering") under our shelf registration statement on Form S-3 (File No. 333-233018) pursuant to which we sold an aggregate of 5,227,272 shares of our common stock at a public offering price of $77.00 per share. We received aggregate net proceeds of $377.5 million, after deducting the underwriting discounts and commissions and offering expenses.

November 2020 Follow-On Offering

On November 2, 2020, we closed an underwritten public offering (the "November 2020 Offering") under our shelf registration statement on Form S-3 (File No. 333-233018) pursuant to which we sold an aggregate of 3,506,098 shares of our common stock at a public offering price of $82.00 per share. We received aggregate net proceeds of $271.7 million, after deducting the underwriting discounts and commissions.

"At-the-Market" Equity Offering

On May 10, 2021, we entered into a Sales Agreement (the "Sales Agreement") with Cowen and Company, LLC ("Cowen"). Pursuant to the terms of the Sales Agreement, we had the ability to sell, from time to time up to an aggregate of $400.0 million of our common stock through an "at-the-market" offering as defined in Rule 415 under the Securities Act of 1933, as amended. We agreed to pay Cowen a commission equal to 3.0% of the gross proceeds from the sale of shares of our common stock under the Sales Agreement and reimburse up to $60,000 of legal expenses incurred by Cowen.

We were not obligated to make any sales of shares of our common stock under the Sales Agreement. As of December 31, 2021, no shares of our common stock were sold under this Sales Agreement. The Sales Agreement was terminated effective February 24, 2022.

Summary Cash Flows

The following table summarizes the primary sources and uses of our cash, cash equivalents, and restricted cash for the periods indicated (in thousands):

	Year Ended December 31,		
	2021	2020	2019
Net cash used in operating activities	$ (207,853)	$ (113,924)	$ (63,012)
Net cash provided by (used in) investing activities	143,238	3,897	(311,971)
Net cash provided by financing activities	10,260	278,837	381,163
Net increase (decrease) in cash, cash equivalents and restricted cash	$ (54,355)	$ 168,810	$ 6,180

Comparison of the Years Ended December 31, 2021 and 2020

Cash Used in Operating Activities

Net cash used in operating activities was $207.9 million for the year ended December 31, 2021, which was primarily attributable to our net loss of $269.9 million adjusted for net noncash charges of $57.3 million and net changes in operating assets and liabilities of $4.7 million. Noncash charges included $50.8 million in stock-based compensation expense, $3.4 million in net amortization of premiums and discounts on marketable securities, $2.3

million in depreciation and amortization expense, $2.6 million in noncash lease expense and $1.9 million in gains from a lease modification.

Net cash used in operating activities was $113.9 million for the year ended December 31, 2020, which was primarily attributable to our net loss of $153.5 million adjusted for net noncash charges of $1.4 million and net changes in operating assets and liabilities of $38.2 million. Noncash charges included $33.4 million in stock-based compensation expense, $2.4 million in net amortization of premiums and discounts on marketable securities, $1.5 million in depreciation and amortization expense and $0.9 million in amortization of right-of-use asset.

Cash Used in Investing Activities

Net cash provided by investing activities was $143.2 million for the year ended December 31, 2021, which consisted of $564.0 million in proceeds from maturities of marketable securities, partially offset by $387.5 million for the purchases of marketable securities and $33.2 million for the purchases of property and equipment.

Net cash provided by investing activities was $3.9 million for the year ended December 31, 2020, which consisted of $546.8 million in proceeds from maturities of marketable securities, partially offset by $542.3 million for the purchases of marketable securities and $0.6 million for the purchases of property and equipment.

Cash Provided by Financing Activities

Net cash provided by financing activities was $10.3 million for the year ended December 31, 2021, which consisted primarily of $8.5 million in proceeds received from employees for the exercise of stock options and $1.8 million in proceeds from the issuance of common stock under the 2018 ESPP.

Net cash provided by financing activities was $278.8 million for the year ended December 31, 2020, which consisted primarily of $271.7 million in net proceeds from the issuance of common stock, $5.7 million in proceeds received from employees for the exercise of stock options and $1.5 million in proceeds from the issuance of common stock under the 2018 ESPP.

Funding Requirements

We will continue to require additional capital to develop our product candidates and fund operations for the foreseeable future. We may seek to raise funding through private or public equity or debt financings, or other sources such as strategic collaborations. Adequate additional funding may not be available to us on acceptable terms or at all. Our failure to raise capital as and when needed could have a negative impact on our financial condition and our ability to pursue our business strategies.

The timing and amount of our capital expenditures will depend on many factors, including:

- the number and scope of clinical indications and clinical trials we decide to pursue;
- the scope and costs of manufacturing activities;
- the extent to which we acquire or in-license other product candidates and technologies, if any;
- the cost, timing and outcome of regulatory review of our product candidates;
- the cost and timing of establishing sales and marketing capabilities for product candidates receiving marketing approval, if any;
- the costs of preparing, filing and prosecuting patent applications, maintaining and enforcing our intellectual property rights and defending intellectual property-related claims;
- our efforts to enhance operational systems and our ability to attract, hire and retain qualified personnel, including personnel to support the development of our product candidates; and
- the costs associated with being a public company.

If we are unable to raise additional funds when needed, we may be required to delay, reduce or terminate some or all of our development efforts. We may also be required to sell or license to others rights to our product candidates in certain territories or indications that we would prefer to develop and commercialize ourselves.

The issuance of additional equity securities may cause our stockholders to experience dilution. Future equity or debt financings may contain terms that are not favorable to us or our stockholders including debt instruments imposing covenants that restrict our operations and limit our ability to incur liens, issue additional debt, pay dividends, repurchase our common stock, make certain investments or engage in certain merger, consolidation, licensing or asset sale transactions.

Contractual Obligations and Commitments

The following table outlines our contractual obligations and commitments at December 31, 2021 (in thousands) and does not incorporate any cancellations or termination agreements entered into subsequent to December 31, 2021:

	Payments Due by Period				
	Total	Less than 1 Year	1-3 Years	3-5 Years	More than 5 Years
Operating lease obligations [1]	$ 77,664	$ 7,445	$ 14,334	$ 15,208	$ 40,677
Purchase obligations [2]	284,826	161,787	123,039	—	—
Total	$ 362,490	$ 169,232	$ 137,373	$ 15,208	$ 40,677

(1) Operating lease obligations represent future lease payments due under our two lease agreements.

(2) Purchase obligations represent noncancelable amounts due to counterparties under various master service agreements.

In addition to the amounts included in the table above, we enter into contracts in the normal course of business with clinical CROs, clinical investigative sites and other counterparties assisting with our preclinical studies and clinical trials. Such contracts are generally cancellable, with varying provisions regarding termination. In the event of a contract being terminated, we would only be obligated for services received as of the effective date of the termination, along with cancellation fees, as applicable.

Approximately $231.2 million of the $284.8 million total noncancellable purchase obligations as of December 31, 2021 related to manufacturing services agreements with Lonza AG or affiliates (such agreements, the “MSAs”). On February 14, 2022 (the “Effective Date”), we entered into a termination agreement (the “Termination Agreement”) with Lonza AG, Lonza Sales Ltd and Lonza Sales AG (collectively, “Lonza”) terminating such MSAs. Lonza will continue to provide certain services to us, including completion of cGMP batches already underway and other services to assist with the transition post-termination. The Termination Agreement provides that we shall pay approximately $136.1 million (126 million Swiss Francs) (the “Termination Amount”) to Lonza as a result of such termination, 95% of which is to be paid within 30 days after the Effective Date, and 5% of which is be paid within 30 days of the release of the remaining cGMP batches. If we fail to pay the first 95% of the Termination Amount to Lonza within 30 days of the Effective Date, Lonza may at its option give notice to us that the Termination Agreement is terminated. The Termination Agreement contains mutual releases by all parties thereto, for all claims known and unknown, relating and arising out of, or connected with, the MSAs and the subject matter(s) thereof, subject to certain exceptions.

Off-Balance Sheet Arrangements

Since our inception, we have not entered into any off-balance sheet arrangements as defined in the rules and regulations of the SEC.

Critical Accounting Policies and Use of Estimates

Our management’s discussion and analysis of our financial condition and results of operations is based on our financial statements, which have been prepared in accordance with generally accepted accounting principles in the United States (“U.S. GAAP”). The preparation of our financial statements requires us to make estimates and assumptions that affect the reported amounts of assets and liabilities and the disclosure of contingent assets and liabilities at the date of the financial statements, as well as the reported expenses incurred during the reporting periods.

Our estimates are based on our historical experience and on various other factors that we believe are reasonable under the circumstances, the results of which form the basis for making judgments about the carrying value of assets and liabilities that are not readily apparent from other sources. Actual results may differ from these estimates under different assumptions or conditions.

We believe that the accounting policies discussed below are critical to understanding our historical and future performance, as these policies relate to the more significant areas involving management's judgments and estimates.

Accrued Contract Research and Development Expense

As part of our preparation of the financial statements, we are required to estimate our accrued expenses as of each balance sheet date. This process involves reviewing open contracts and purchase orders, as well as working with internal personnel to identify the existence and extent of services that have been performed on our behalf which have not yet been invoiced. We make estimates of our accrued expenses as of each balance sheet date based on facts and circumstances known to us at that time. We periodically confirm the accuracy of our estimates, recording adjustments, if necessary.

Estimates underlying accrued contract research and development expense primarily relate to our evaluation of the timing and extent of development and manufacturing services performed by our CDMOs, as well as research activities performed by CROs and clinical investigative sites activities on our behalf. As the financial terms included within service agreements with such vendors vary from contract to contract and often include uneven payment flows, our evaluation focuses on the level of effort and resources expended. Accordingly, the calculation of accrued contract research and development expense requires us to analyze a significant amount of inputs and data from multiple internal and external sources, including information from communications with clinical operations and technical operations personnel.

Although we do not expect our estimates to be materially different from amounts actually incurred, if our estimates of the status and timing of services performed differ from the actual status and timing of services performed, it could result in us reporting amounts that are higher or lower in any particular period. To date, there have been no material differences between our estimates of such expenses and the amounts actually incurred for the periods reported.

Operating Leases

We account for our leases in accordance with Financial Accounting Standards Board ("FASB") Accounting Standards Codification ("ASC") 842, "Leases" ("ASC 842"). Right-of-use assets represent our right to use an underlying asset over the lease term and include any lease payments made prior to the lease commencement date and are reduced by lease incentives. Lease liabilities represent the present value of our total lease payments over the lease term, calculated using our incremental borrowing rate. In determining our incremental borrowing rate, we considered the term of the lease and our credit risk. We recognize options to extend a lease when it is reasonably certain that we will exercise such extension. We do not recognize options to terminate a lease when it is reasonably certain that we will not exercise such early termination options.

Stock-Based Compensation

We account for stock-based compensation expense resulting from stock-based awards granted to employees and nonemployees in accordance with ASC 718, Compensation—Stock Compensation, ("ASC 718"). Per ASC 718, we measure the fair value of stock-based awards on the date of grant and recognize the associated compensation expense, net of impact from estimated forfeitures, over the requisite service period on a straight-line basis. The vesting period of the stock-based award has historically served as the requisite service period for the respective grants to our employees, nonemployee directors and consultants. At each subsequent reporting date, we are required to evaluate whether the achievement of any associated vesting conditions is probable and whether or not any such events have occurred that would have resulted in the acceleration of vesting.

Determining the amount of stock-based compensation expense to be recorded requires us to develop estimates of the fair value of stock options as of the date of grant. We estimate the fair value of each stock-based award using

the Black-Scholes option-pricing model. The Black-Scholes option-pricing model uses highly subjective inputs such as the fair value of our common stock, as well as other assumptions including the expected volatility of our common stock, the expected term of the respective stock-based award, the risk-free interest rate for a period that approximates the expected term of the stock-based award being valued and the expected dividend yield on our common stock over the expected term.

Expected volatility. As we do not have sufficient trading history for our common stock, we have based our computation of expected volatility on the historical volatility of a representative group of public life science companies with similar characteristics to us, including company age and stage of product development. The historical volatility data is calculated based on a period of time commensurate with the expected term of the stock-based award being valued. We will continue to utilize this approach until a sufficient amount of historical information regarding the volatility of our own stock price becomes available or until other relevant circumstances change, such as our assessment that our identified entities are no longer appropriate to use as representative companies. In the latter case, more suitable, similar entities with publicly available stock prices will be incorporated in the calculation.

Expected term. In order to estimate the expected term of a stock-based award, we use the simplified method prescribed by SEC Staff Accounting Bulletin No. 107, *Share-Based Payment*, as we do not have sufficient historical exercise data to provide a reasonable basis upon which to estimate the expected term. Under this approach, the expected term is presumed to be the average of the contractual term (ten years) and the vesting term (generally four years) of the stock-based award. We have not historically experienced, nor do we expect there to be substantially different exercise or post-vesting termination behavior among our employees and directors.

Risk-free interest rate. The risk-free interest rate is based on publicly available yields of U.S. Treasury instruments with maturities consistent with the expected term of the stock-based award.

Expected dividend yield. The expected dividend yield is assumed to be zero as we have never paid dividends and have no current plans to pay any dividends on our common stock.

Income Taxes

We account for income taxes under the asset and liability method. Current income tax expense or benefit represents the amount of income taxes we expect to pay or have refunded in the current year. Our deferred income tax assets and liabilities are determined based on differences between financial statement reporting and tax basis accounting of assets and liabilities and net operating loss and credit carryforwards, which we measure using the enacted tax rates and laws that will be in effect when such items are expected to reverse. We reduce deferred income tax assets, as necessary, by applying a valuation allowance to the extent that we determined it is more likely than not that some or all of our tax benefits will not be realized.

We account for uncertain tax positions in accordance with ASC 740-10, *Accounting for Uncertainty in Income Taxes*. We assess all material positions reflected in our income tax returns, including all significant uncertain positions, for all tax years that are subject to assessment or challenge by relevant taxing authorities. Upon determining the sustainability of our positions, we measure the largest amount of benefit possessing greater than fifty percent likelihood of being realized upon ultimate settlement. We reassess such positions at each balance sheet date to determine whether any factors underlying the sustainability assertion have changed and whether or not the amount of the recognized tax benefit is still appropriate.

As of December 31, 2021, our gross deferred tax assets were $203.5 million. Due to our lack of earnings history and uncertainties surrounding our ability to generate future taxable income, we have offset the total net deferred tax assets with a full valuation allowance. The deferred tax assets were primarily comprised of federal and state tax net operating losses, (“NOLs”), which may be limited by certain rules governing changes in ownership, as defined in Section 382 of the Internal Revenue Code of 1986, as amended. Similar rules may apply under state tax laws. Our ability to use our remaining NOLs may be further limited if we experience future ownership changes.

Judgments concerning the recognition and measurement of our tax benefits, as well as limitations surrounding their realizability, might change as new information becomes available.

Recent Accounting Pronouncements

See Note 2 to our financial statements for recently issued accounting pronouncements, including the respective effective dates of adoption and effects on our results of operations and financial condition.

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

Interest Rate Sensitivity

We are exposed to market risk related to changes in interest rates. Our primary exposure to market risk is interest rate sensitivity, which is affected by changes in the general level of U.S. interest rates, particularly because our investments, including cash equivalents, are in money market funds that invest in U.S. Treasury obligations. The primary objective of our investment activities is to preserve capital to fund our operations. We also seek to maximize income from our investments without assuming significant risk. Due to the short-term maturities and low credit risk profile of our balances held in money market funds, a hypothetical 10% change in interest rates would not have a material effect on the fair market value of our cash equivalents and marketable securities.

Foreign Currency Sensitivity

Our primary operations are transacted in U.S. Dollars, however, certain service agreements with third parties are denominated in currencies other than the U.S. Dollar, primarily the British Pound and Euro. As such, we are subject to foreign exchange risk and therefore, fluctuations in the value of the U.S. Dollar against the British Pound and Euro may impact the amounts reported for expenses and obligations incurred under such agreements. We do not currently engage in any hedging activity to reduce our potential exposure to currency fluctuations, although we may choose to do so in the future. A hypothetical 10% change in foreign exchange rates during any of the periods presented would not have had a material impact on our financial condition or results of operations.

Item 8. Financial Statements and Supplementary Data.

ALLAKOS INC.
INDEX TO FINANCIAL STATEMENTS

Report of Independent Registered Public Accounting Firm

To the Stockholders and the Board of Directors of Allakos Inc.

Opinion on the Financial Statements

We have audited the accompanying balance sheets of Allakos Inc. (the Company) as of December 31, 2021 and 2020, the related statements of operations and comprehensive loss, statements of stockholders' equity and cash flows for each of the three years in the period ended December 31, 2021, and the related notes (collectively referred to as the “financial statements”). In our opinion, the financial statements present fairly, in all material respects, the financial position of the Company at December 31, 2021 and 2020, and the results of its operations and its cash flows for each of the three years in the period ended December 31, 2021, 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, 2021, based on criteria established in Internal Control-Integrated Framework issued by the Committee of Sponsoring Organizations of the Treadway Commission (2013 framework), and our report dated March 1, 2022 expressed an unqualified opinion thereon.

Basis for Opinion

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

We conducted our audits in accordance with the standards of the PCAOB. Those standards require that we plan and perform the audit to obtain reasonable assurance about whether the financial statements are free of material misstatement, whether due to error or fraud. Our audits included performing procedures to assess the risks of material misstatement of the financial statements, whether due to error or fraud, and performing procedures that respond to those risks. Such procedures included examining, on a test basis, evidence regarding the amounts and disclosures in the financial statements. Our audits also included evaluating the accounting principles used and significant estimates made by management, as well as evaluating the overall presentation of the financial statements. We believe that our audits provide a reasonable basis for our opinion.

Critical Audit Matter

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

Accrued contract research and development expenses

Description of the Matter	As discussed in Note 2, accrued research and development expenses are recorded for estimated unpaid costs of research and development activities conducted by the Company and its third-party service providers, which include the conduct of preclinical and clinical studies, and contract manufacturing activities. Accrued research and development expenses were $16.2 million as of December 31, 2021 and include the estimated costs of accrued clinical investigative sites expenses incurred but not yet invoiced under agreements with investigative clinical trial sites that conduct research and development activities on behalf of the Company ("Accrued Clinical Investigative Sites Expenses"). The accrual for these Accrued Clinical Investigative Site Expenses is determined after consideration of several factors, including estimates of services completed. Auditing these Accrued Clinical Investigative Sites Expenses was complex due to the required analysis of extensive data in determining the estimated unpaid expenses.
How We Addressed the Matter in Our Audit	We obtained an understanding, evaluated the design, and tested the operating effectiveness of relevant controls over the Company's determination of Accrued Clinical Investigative Sites Expenses, including controls over the determination of significant assumptions and the completeness and accuracy of the data used in determining these accrued costs. Our audit procedures included, among others, testing the accuracy and completeness of the inputs used in management's analysis to determine costs incurred. We verified that the accrued amounts were in accordance the terms and conditions of the underlying agreements and the information provided by third-party service providers. We also evaluated management's estimates of the progress of the clinical trials by making direct inquiries of the Company's personnel that oversee the clinical trials.

/s/ Ernst & Young LLP

We have served as the Company's auditor since 2016.

Redwood City, California
March 1, 2022

ALLAKOS INC.
BALANCE SHEETS
(in thousands, except per share data)

	December 31, 2021	December 31, 2020
Assets		
Current assets:		
Cash and cash equivalents	$ 152,822	$ 207,177
Investments in marketable securities	271,416	451,820
Prepaid expenses and other current assets	27,343	10,270
Total current assets	451,581	669,267
Property and equipment, net	43,100	8,345
Operating lease right-of-use assets	31,707	39,731
Other long-term assets	8,436	2,275
Total assets	$ 534,824	$ 719,618
Liabilities and stockholders' equity		
Current liabilities:		
Accounts payable	$ 13,692	$ 13,960
Accrued expenses and other current liabilities	26,557	8,490
Total current liabilities	40,249	22,450
Operating lease liabilities, net of current portion	49,099	42,773
Total liabilities	89,348	65,223
Commitments and contingencies (Notes 6 and 7)		
Stockholders' equity:		
Preferred stock, $0.001 par value per share; 20,000 shares authorized as of December 31, 2021 and 2020; no shares issued and outstanding as of December 31, 2021 and 2020	—	—
Common stock, $0.001 par value per share; 200,000 shares authorized as of December 31, 2021 and 2020; 54,622 and 53,081 shares issued and outstanding as of December 31, 2021 and 2020, respectively	54	53
Additional paid-in capital	1,058,399	997,298
Accumulated other comprehensive gain (loss)	(153)	8
Accumulated deficit	(612,824)	(342,964)
Total stockholders' equity	445,476	654,395
Total liabilities and stockholders' equity	$ 534,824	$ 719,618

See accompanying notes to financial statements

ALLAKOS INC.
STATEMENTS OF OPERATIONS AND COMPREHENSIVE LOSS
(in thousands, except per share data)

	Year Ended December 31,		
	2021	2020	2019
Operating expenses			
Research and development	$ 196,328	$ 105,533	$ 61,858
General and administrative	75,147	51,524	29,560
Total operating expenses	271,475	157,057	91,418
Loss from operations	(271,475)	(157,057)	(91,418)
Interest income	377	4,313	6,201
Other income (expense), net	1,238	(736)	(155)
Net loss	(269,860)	(153,480)	(85,372)
Unrealized gain (loss) on marketable securities	(161)	(129)	152
Comprehensive loss	$ (270,021)	$ (153,609)	$ (85,220)
Net loss per common share:			
Basic and diluted	$ (5.01)	$ (3.10)	$ (1.89)
Weighted-average number of common shares outstanding:			
Basic and diluted	53,832	49,492	45,191

See accompanying notes to financial statements

ALLAKOS INC.
STATEMENTS OF STOCKHOLDERS' EQUITY
(in thousands)

	Common Stock		Additional Paid-In Capital	Accumulated Other Comprehensive Gain (Loss)	Accumulated Deficit	Total Stockholders' Equity
	Shares	Amount				
Balance as of December 31, 2018	42,117	$ 42	$ 288,079	$ (15)	$ (104,112)	$ 183,994
Stock-based compensation expense	—	—	15,764	—	—	15,764
Issuance of common stock upon exercise of stock options	1,250	1	2,447	—	—	2,448
Issuance of common stock upon 2018 ESPP purchase	74	—	1,190	—	—	1,190
Issuance of common stock upon follow-on offering, net of offering costs of $24,975	5,227	5	377,520	—	—	377,525
Vesting of restricted common stock	—	—	20	—	—	20
Unrealized gain on marketable securities, net of tax	—	—	—	152	—	152
Net loss	—	—	—	—	(85,372)	(85,372)
Balance as of December 31, 2019	48,668	$ 48	$ 685,020	$ 137	$ (189,484)	$ 495,721
Stock-based compensation expense	—	—	33,446	—	—	33,446
Issuance of common stock upon exercise of stock options	700	1	5,695	—	—	5,696
Issuance of common stock upon 2018 ESPP purchase	70	—	1,454	—	—	1,454
Issuance of common stock upon follow-on offering, net of offering costs of $15,813	3,506	4	271,683	—	—	271,687
Issuance of common stock upon vesting of restricted stock units	137	—	—	—	—	—
Unrealized loss on marketable securities	—	—	—	(129)	—	(129)
Net loss	—	—	—	—	(153,480)	(153,480)
Balance as of December 31, 2020	53,081	$ 53	$ 997,298	$ 8	$ (342,964)	$ 654,395
Stock-based compensation expense	—	—	50,842	—	—	50,842
Issuance of common stock upon exercise of stock options	1,227	1	8,491	—	—	8,492
Issuance of common stock upon 2018 ESPP purchase	29	—	1,768	—	—	1,768
Issuance of common stock upon vesting of restricted stock units	285	—	—	—	—	—
Unrealized loss on marketable securities	—	—	—	(161)	—	(161)
Net loss	—	—	—	—	(269,860)	(269,860)
Balance as of December 31, 2021	54,622	$ 54	$ 1,058,399	$ (153)	$ (612,824)	$ 445,476

See accompanying notes to financial statements

ALLAKOS INC.
STATEMENTS OF CASH FLOWS
(in thousands)

	Year Ended December 31,		
	2021	**2020**	**2019**
Cash flows from operating activities			
Net loss	$ (269,860)	$ (153,480)	$ (85,372)
Adjustments to reconcile net loss to net cash used in operating activities:			
Stock-based compensation	50,842	33,446	15,764
Net amortization of premiums and discounts on marketable securities	3,389	2,358	(2,664)
Depreciation and amortization	2,310	1,545	1,508
Noncash lease expense	2,570	794	275
Gain on lease modification	(1,873)	—	—
Loss on disposal of property and equipment	46	—	—
Changes in operating assets and liabilities:			
Prepaid expenses and other current assets	(16,678)	(7,601)	463
Other long-term assets	(6,161)	—	(564)
Accounts payable	(232)	7,644	3,571
Accrued expenses and other current liabilities	13,594	900	4,077
Operating lease liabilities, net of current portion	14,200	470	(70)
Net cash used in operating activities	(207,853)	(113,924)	(63,012)
Cash flows from investing activities			
Purchases of marketable securities	(387,541)	(542,273)	(541,701)
Proceeds from maturities of marketable securities	564,000	546,800	230,500
Purchases of property and equipment	(33,221)	(630)	(770)
Net cash provided by (used in) investing activities	143,238	3,897	(311,971)
Cash flows from financing activities			
Proceeds from issuance of common stock, net of issuance costs	—	271,687	377,525
Proceeds from exercise of stock options, net of repurchases	8,492	5,696	2,448
Proceeds from issuance of common stock under 2018 ESPP	1,768	1,454	1,190
Net cash provided by financing activities	10,260	278,837	381,163
Net increase (decrease) in cash, cash equivalents and restricted cash	(54,355)	168,810	6,180
Cash, cash equivalents and restricted cash, beginning of period	209,452	40,642	34,462
Cash, cash equivalents and restricted cash, end of period	$ 155,097	$ 209,452	$ 40,642
Supplemental disclosures			
Right-of-use assets obtained in exchange for lease obligations	$ 200	$ 34,750	$ 6,050
Vesting of restricted common stock subject to repurchase	$ —	$ —	$ 20
Property and equipment purchased but unpaid	$ 3,890	$ 353	$ —

See accompanying notes to financial statements

1. Organization and Business

Allakos Inc. ("Allakos" or the "Company") was incorporated in the state of Delaware in March 2012. Allakos is a clinical stage biopharmaceutical company focused on the development of lirentelimab for the treatment of eosinophil and mast cell related diseases. The Company's primary activities to date have included establishing its facilities, recruiting personnel, conducting research and development of its product candidates and raising capital. The Company's operations are located in Redwood City, California.

Liquidity Matters

Since inception, the Company has incurred net losses and negative cash flows from operations. During the year ended December 31, 2021, the Company incurred a net loss of $269.9 million and used $207.9 million of cash in operations. As of December 31, 2021, the Company had an accumulated deficit of $612.8 million and does not expect to experience positive cash flows from operating activities in the foreseeable future. The Company has financed its operations to date primarily through the sale of common stock. Management expects to incur additional operating losses in the future as the Company continues to further develop, seek regulatory approval for and, if approved, commence commercialization of its product candidates.

Due to the clinical study results released in December 2021, our Board of Directors approved in February 2022 plans to reduce our contractual commitments with Lonza and a reorganization plan (the "Reorganization Plan") to reduce operating costs and better align our workforce with the clinical development plans of our business. Refer to Note 12 "Subsequent Events" for additional information. The Company had $424.2 million of cash, cash equivalents and marketable securities at December 31, 2021.

Management believes that this amount is sufficient to fund the Company's operations for at least the next 12 months from the issuance date of these financial statements.

2. Summary of Significant Accounting Policies

Basis of Presentation

The financial statements have been prepared in accordance with United States generally accepted accounting principles ("U.S. GAAP"). The preparation of financial statements in conformity with U.S. GAAP requires management to make estimates and assumptions that affect the amounts and disclosures reported in the financial statements and accompanying notes.

Use of Estimates

Management uses significant judgment when making estimates related to common stock valuation and related stock-based compensation expense, accrued research and development expense, and lease related assets and liabilities. Management bases its estimates on historical experience and on various other assumptions that are believed to be reasonable under the circumstances, the results of which form the basis for making judgments about the carrying values of assets and liabilities that are not readily apparent from other sources. Actual results could differ from those estimates under different assumptions or conditions, and those differences could be material to the financial position and results of operations.

Concentration of Credit Risk and Other Risks and Uncertainties

Financial instruments that potentially subject the Company to credit risk principally consist of cash, cash equivalents and marketable securities. These financial instruments are held in accounts at a single financial institution that management believes possesses high credit quality. Amounts on deposit with this financial institution have and will continue to exceed federally-insured limits. The Company has not experienced any losses on its cash deposits. Additionally, the Company's investment policy limits its investments to certain types of securities issued by the United States government and its agencies.

The Company is subject to a number of risks similar to that of other early-stage biopharmaceutical companies, including, but not limited to, the need to obtain adequate additional funding, possible failure of current or future clinical trials, its reliance on third-parties to conduct its clinical trials, the need to obtain regulatory and marketing approvals for its product candidates, competitive developments, the need to successfully commercialize and gain market acceptance of the Company's product candidates, its right to develop and commercialize its product candidates pursuant to the terms and conditions of the licenses granted to the Company, protection of proprietary technology, the ability to make milestone, royalty or other payments due under licensing agreements, and the need to secure and maintain adequate manufacturing arrangements with third-parties. If the Company does not successfully commercialize or partner its product candidates, it will be unable to generate product revenue or achieve profitability.

Cash, Cash Equivalents and Restricted Cash

The Company considers all highly liquid investments with original maturities of three months or less from the date of purchase to be cash equivalents. The following table provides a reconciliation of cash, cash equivalents and restricted cash reported within the Company's balance sheets and which, in aggregate, represent the amounts reported in the statements of cash flows (in thousands):

	December 31,		
	2021	2020	2019
Cash and cash equivalents	$ 152,822	$ 207,177	$ 38,367
Restricted cash	2,275	2,275	2,275
Total	$ 155,097	$ 209,452	$ 40,642

Restricted cash at December 31, 2021 represents $2.3 million of security deposits for the lease of the Company's facilities in Redwood City, California and San Carlos, California. Both security deposits are in the form of letters of credit secured by restricted cash. Restricted cash amounts are included within other long-term assets on the Company's balance sheets.

Marketable Securities

The Company invests in marketable securities, primarily securities issued by the United States government and its agencies. The Company's marketable securities are considered available-for-sale and are classified as current assets even when the stated maturities of the underlying securities exceed one year from the date of the current balance sheet being reported. This classification reflects management's ability and intent to utilize proceeds from the sale of such investments to fund ongoing operations. Unrealized gains and losses are excluded from earnings and are reported as a component of accumulated other comprehensive gain. The cost of securities sold is determined using the specific-identification method. Interest earned and adjustments for the amortization of premiums and discounts on investments are included in interest income, net, on the statements of operations and comprehensive loss. Realized gains and losses and declines in fair value judged to be other than temporary, if any, on investments in marketable securities are included in other expense, net, on the statements of operations and comprehensive loss.

Fair Value Measurements

The Company accounts for fair value of its financial instruments in accordance with Financial Accounting Standards Board (the "FASB") Accounting Standards Codification ("ASC") Topic No. 820, *Fair Value Measurements* ("ASC 820"). ASC 820 establishes a common definition for fair value, establishes a framework for measuring fair value and expands disclosures about such fair value measurements. Additionally, ASC 820 defines fair value as the price that would be received to sell an asset or paid to transfer a liability in an orderly transaction between market participants at the measurement date.

The Company measures fair value based on a three-level hierarchy of inputs, of which the first two are considered observable and the last unobservable. Unobservable inputs reflect the Company's own assumptions about current market conditions. The three-level hierarchy of inputs is as follows:

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

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

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

To the extent that the valuation is based on models or inputs that are less observable or unobservable in the market, the determination of fair value requires more judgment. Accordingly, the degree of judgment exercised by the Company in determining fair value is greatest for instruments categorized in Level 3. A financial instrument's level within the fair value hierarchy is based on the lowest level of any input that is significant to the fair value measurement.

The carrying amounts reflected in the Company's balance sheets for cash and cash equivalents, prepaid expenses and other current assets, other long-term assets, accounts payable, and accrued expenses and other current liabilities approximate fair value, due to their short-term nature. The Company's investments in marketable securities are measured at fair value in accordance with the levels above.

Property and Equipment, Net

Property and equipment are stated at cost, net of accumulated depreciation. Depreciation is computed using the straight-line method over the estimated useful lives of the assets. Generally, the useful lives of laboratory equipment are five years, furniture and office equipment are three to five years, and leasehold improvements property and equipment are the shorter of the remaining lease term or the estimated life of the assets.

Any resulting gains or losses on dispositions of property and equipment are included as a component of other income (expense), net, within the Company's statements of operations and comprehensive loss. Repair and maintenance costs that do not significantly add value to the property and equipment, or prolong its life, are charged to operating expense as incurred.

Operating Leases

The Company accounts for its leases in accordance with Financial Accounting Standards Board ("FASB") Accounting Standards Codification ("ASC") 842, "Leases" ("ASC 842"). Right-of-use assets represent the Company's right to use an underlying asset over the lease term and include any lease payments made prior to the lease commencement date and are reduced by lease incentives. Lease liabilities represent the present value of the total lease payments over the lease term, calculated using the Company's incremental borrowing rate. In determining the Company's incremental borrowing rate, consideration is given to the term of the lease and the Company's credit risk. The Company recognizes options to extend a lease when it is reasonably certain that it will exercise such extension. The Company does not recognize options to terminate a lease when it is reasonably certain that it will not exercise such early termination options. Lease expense is recognized on a straight-line basis over the expected lease term.

Accrued Research and Development Expense

Service agreements with contract development and manufacturing organizations ("CDMOs"), clinical contract research organizations ("CROs") and clinical investigative sites comprise a significant component of the Company's research and development activities. External costs for these vendors are recognized as the services are incurred. The Company accrues for expenses resulting from obligations under agreements with its third-parties for which the timing of payments does not match the periods over which the materials or services are provided to the Company. Accruals are recorded based on estimates of services received and efforts expended pursuant to agreements established with CDMOs, clinical CROs, clinical investigative sites and other outside service providers. These estimates are typically based on contracted amounts applied to the proportion of work performed and determined through analysis with internal personnel and external service providers as to the progress or stage of completion of the services.

The Company makes judgements and estimates in determining the accrual balance in each reporting period. In the event advance payments are made to a CDMO, clinical CRO, clinical investigative site or other outside service provider, the payments are recorded within prepaid expenses and other current assets and subsequently recognized as research and development expense when the associated services have been performed. As actual costs become known,

the Company adjusts its liabilities and assets. Inputs, such as the extent of services received and the duration of services to be performed, may vary from the Company's estimates, which will result in adjustments to research and development expense in future periods. Changes in these estimates that result in material changes to the Company's accruals could materially affect the Company's results of operations. The Company's historical estimates have not been materially different from actual amounts recorded.

Research and Development Expense

Research and development costs are expensed as incurred. Research and development costs include, among others, consulting costs, salaries, benefits, travel, stock-based compensation, laboratory supplies and other non-capital equipment utilized for in-house research, allocation of facilities and overhead costs and external costs paid to third-parties that conduct research and development activities on the Company's behalf. Amounts incurred in connection with license agreements, including milestone payments, are also included in research and development expense.

Advance payments for goods or services to be rendered in the future for use in research and development activities are deferred and included in prepaid expenses and other current assets. The deferred amounts are expensed as the related goods are delivered or the services are performed.

Segments

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

Patent Costs

The Company expenses patent application and related legal costs as incurred and classifies such costs as general and administrative expenses in the statements of operations and comprehensive loss.

Stock-Based Compensation

The Company accounts for its stock-based compensation in accordance with FASB ASC Topic 718, *Compensation—Stock Compensation* ("ASC 718"). ASC 718 requires all stock-based awards issued to employees and nonemployees to be recognized as expense in the statements of operations and comprehensive loss based on their grant date fair values. Stock-based awards issued to nonemployee consultants are accounted for based on the fair value of services to be received or of the intrinsic value of equity instruments to be issued, whichever is more reliably measured. The measurement date for awards issued to nonemployee consultants is the date of grant.

For purposes of determining the estimated fair value of stock options granted to employees and nonemployees, the Company uses the Black-Scholes option pricing model. The Black-Scholes option pricing model requires the input of certain assumptions that involve judgment, for which changes can materially affect the resulting estimates of fair value. The assumptions used to determine the fair value of stock options granted were as follows:

Expected volatility – As there is insufficient trading history for the Company's common stock, the Company has based its computation of expected volatility on the historical volatility of a representative group of public companies with similar characteristics to the Company, including stage of product development and life science industry focus. The historical volatility is calculated based on a period of time commensurate with the expected term assumption.

Expected term – The Company determines the expected term in accordance with the "simplified method" described by SEC Staff Accounting Bulletin No. 107, *Share-Based Payment*, as it does not have sufficient historical exercise data to provide a reasonable basis upon which to estimate the expected term.

Risk-free interest rate – The Company bases the risk-free interest rate on United States Treasury securities with terms consistent to the expected term of the stock option being valued.

Expected dividends – The expected dividend yield is assumed to be zero as the Company has never paid dividends and has no current plans to pay any dividends on its common stock.

The fair value of restricted stock units (“RSUs”) is determined using the quoted market price of the Company’s common stock on the date of grant.

The Company uses historical data to estimate pre-vesting forfeitures and records stock-based compensation expense only for those awards expected to vest. To the extent that actual forfeitures differ from estimates, the difference is recorded as a cumulative adjustment in the period the estimate are revised. The Company expenses the fair value of its stock-based compensation awards to employees and nonemployees on a straight-line basis over the requisite service period, which is generally the vesting period.

The Company recognizes the stock-based compensation expense related to performance-based stock awards or performance-based RSUs ("PSUs") if the performance targets are deemed probable of being achieved. The vesting of PSUs requires that certain performance conditions are achieved during the performance period and is subject to the employee’s continued service requirements.

Income Taxes

We account for income taxes under the asset and liability method. Current income tax expense or benefit represents the amount of income taxes we expect to pay or have refunded in the current year. Our deferred income tax assets and liabilities are determined based on differences between financial statement reporting and tax basis accounting of assets and liabilities and net operating loss and credit carryforwards, which we measure using the enacted tax rates and laws that will be in effect when such items are expected to reverse. We reduce deferred income tax assets, as necessary, by applying a valuation allowance to the extent that we determined it is more likely than not that some or all of our tax benefits will not be realized.

We account for uncertain tax positions in accordance with ASC 740-10, Accounting for Uncertainty in Income Taxes. We assess all material positions reflected in our income tax returns, including all significant uncertain positions, for all tax years that are subject to assessment or challenge by relevant taxing authorities. Upon determining the sustainability of our positions, we measure the largest amount of benefit possessing greater than fifty percent likelihood of being realized upon ultimate settlement. We reassess such positions at each balance sheet date to determine whether any factors underlying the sustainability assertion have changed and whether or not the amount of the recognized tax benefit is still appropriate.

Comprehensive Loss

Comprehensive loss is defined as the change in stockholders’ equity during a period from transactions and other events and circumstances from non-owner sources. The difference between net loss and comprehensive loss for the years ended December 31, 2021, 2020 and 2019 are a result of unrealized gains and losses on the Company’s investments in marketable securities included in current assets on the balance sheets.

Net Loss per Share

The Company calculates basic net loss per share by dividing the net loss attributable to common stockholders by the weighted-average shares of common stock outstanding during the period. The Company calculates diluted net loss per share after giving consideration to all potentially dilutive securities outstanding during the period using the treasury-stock and if-converted methods, except where the effect of including such securities would be anti-dilutive. Because the Company has reported net losses since inception, the effect from potentially dilutive securities would have been anti-dilutive and therefore has been excluded from the calculation of diluted net loss per share.

Basic and diluted net loss per share was calculated as follows (in thousands, except per share data):

	Year Ended December 31,		
	2021	2020	2019
Numerator:			
Net loss	$ (269,860)	$ (153,480)	$ (85,372)
Denominator:			
Weighted-average shares of common stock outstanding, basic and diluted	53,832	49,492	45,191
Net loss per share, basic and diluted	$ (5.01)	$ (3.10)	$ (1.89)

The following table sets forth the potentially dilutive securities that have been excluded from the calculation of diluted net loss per share due to their anti-dilutive effect for the periods indicated (in thousands):

	Year Ended December 31,		
	2021	2020	2019
Options to purchase common stock	5,530	6,616	7,148
Unvested restricted stock units	1,506	1,161	542
Unvested performance stock unit	113	—	—
Shares issuable under employee stock purchase plans	118	14	31
Total	7,267	7,791	7,721

Foreign Currency Transactions

The Company is party to multiple contract manufacturing and clinical research agreements for which services to be performed are denominated in foreign currencies other than the United States Dollar. The Company records gains and losses attributable to fluctuations in foreign currencies as a component of other income (expense), net, on the statements of operations and comprehensive loss.

Recently Issued and Adopted Accounting Pronouncements

The Company has reviewed recently issued accounting pronouncements and concluded they are either not applicable to the business or that no material effect is expected on the Financial Statements as a result of future adoption.

3. Fair Value Measurements

The Company measures and reports certain financial instruments as assets and liabilities at fair value on a recurring basis. The Company's financial assets measured at fair value on a recurring basis were as follows (in thousands):

	December 31, 2021			
	Level 1	Level 2	Level 3	Total
Cash equivalents				
Money market funds	$ 150,781	$ —	$ —	$ 150,781
Total cash equivalents	150,781	—	—	150,781
Short-term marketable securities				
U.S. treasuries	271,416	—	—	271,416
Total short-term marketable securities	271,416	—	—	271,416
Total cash equivalents and short-term marketable securities	$ 422,197	$ —	$ —	$ 422,197

	December 31, 2020			
	Level 1	Level 2	Level 3	Total
Cash equivalents				
Money market funds	$ 205,408	$ —	$ —	$ 205,408
Total cash equivalents	205,408	—	—	205,408
Short-term marketable securities				
U.S. treasuries	451,820	—	—	451,820
Total short-term marketable securities	451,820	—	—	451,820
Total cash equivalents and short-term marketable securities	$ 657,228	$ —	$ —	$ 657,228

The Company evaluates transfers between levels at the end of each reporting period. There were no transfers of assets or liabilities between levels during the years ended December 31, 2021 and 2020.

4. Marketable Securities

All marketable securities were considered available-for-sale at December 31, 2021 and 2020. The amortized cost, gross unrealized holding gains or losses, and fair value of the Company's marketable securities by major security type are summarized in the table below (in thousands):

	December 31, 2021			
	Amortized Cost Basis	Unrealized Gains	Unrealized Losses	Fair Value
Available-for-sale securities				
U.S. treasuries classified as investments	$ 271,570	$ 2	$ (156)	$ 271,416
Total	$ 271,570	$ 2	$ (156)	$ 271,416

	December 31, 2020			
	Amortized Cost Basis	Unrealized Gains	Unrealized Losses	Fair Value
Available-for-sale securities				
U.S. treasuries classified as investments	$ 451,812	$ 26	$ (18)	$ 451,820
Total	$ 451,812	$ 26	$ (18)	$ 451,820

The amortized cost of available-for-sale securities is adjusted for amortization of premiums and accretion of discounts to maturity. As of December 31, 2021 and 2020, the aggregate fair value of securities held by the Company in an unrealized loss position for less than twelve months was $241.4 million and $91.4 million, respectively. All of these securities had remaining maturities of less than one year. The Company has the intent and ability to hold such securities until recovery and has determined that there has been no material change to their credit risk. As a result, the Company determined it did not hold any investments with a credit loss at December 31, 2021 and 2020.

There were no material realized gains or losses recognized on the sale or maturity of available-for-sale securities during the years ended December 31, 2021, 2020 and 2019, and as a result, there were no material reclassifications out of accumulated other comprehensive gain (loss) for the same periods.

5. Balance Sheet Components and Supplemental Disclosures

Property and Equipment, Net

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

	December 31,	
	2021	2020
Laboratory equipment	$ 4,676	$ 4,236
Furniture and office equipment	1,947	1,784
Leasehold improvements	4,581	4,581
Construction-in-progress	37,704	1,325
	48,908	11,926
Less accumulated depreciation	(5,808)	(3,581)
Property and equipment, net	$ 43,100	$ 8,345

Depreciation and amortization expense for the years ended December 31, 2021, 2020 and 2019 was $2.3 million, $1.5 million and $1.5 million, respectively. The increase in construction-in-progress assets in 2021 primarily relate to tenant improvements at the Company's new corporate headquarters and is expected to be completed and put into service during the first quarter of 2022.

Accrued Expenses and Other Current Liabilities

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

	December 31,	
	2021	2020
Accrued contract research and development expense	$ 16,215	$ 4,697
Accrued compensation and benefits expense	3,172	3,214
Current portion of operating lease liabilities	2,316	492
Other current liabilities	4,854	87
Total	$ 26,557	$ 8,490

6. Leases

Operating Leases

The Company's lease obligations primarily relate to leased office and laboratory space under noncancelable operating leases. In accordance with ASC 842, the Company has performed an evaluation of its other contracts with vendors and has determined that, except for the leases described below, none of its other contracts contain a lease.

2018 Redwood City Lease

In January 2018, the Company entered into an operating lease agreement for approximately 25,000 square feet of office and laboratory space in Redwood City, California (the "2018 Redwood City Lease"). The contractual term of the 2018 Redwood City Lease was 10.75 years beginning from the substantial completion and delivery of the premises, which occurred in November 2018, and originally terminating in July 2029.

The 2018 Redwood City Lease includes monthly base rent amounts escalating over the term of the lease. In addition, the lessor provided for a tenant improvement allowance ("TIA") up to $1.4 million, which was fully utilized. The TIA was recorded as leasehold improvements, with offsetting adjustments recorded to the associated operating lease right of use asset included on the balance sheets as of December 31, 2021 and 2020.

In November 2021, the Company entered into a lease termination agreement (the "Termination Agreement") with respect to the 2018 Redwood City Lease. Pursuant to the Termination Agreement, the 2018 Redwood City Lease will be terminated effective April 30, 2022. The Company accounted for this change in lease term as a modification of the original lease. As a result of the modification, the operating right-of-use asset and lease liability were

remeasured. As of December 31, 2021, the remaining lease liability of $0.6 million was recognized on the balance sheet. There is no remaining right-of-use asset as of December 31, 2021. The Company recognized $1.9 million as gain on lease modifications in the fourth quarter of 2021, which is included in other income (expense), net on the statements of operations and comprehensive loss.

In connection with the early termination and upon satisfaction of certain conditions including the delivery of certain equipment and other assets related to the building, the landlord agreed to pay to the Company $1.1 million.

2019 San Carlos Lease

In December 2019, the Company entered into an additional operating lease agreement for approximately 98,000 square feet of office and laboratory space in San Carlos, California (the "2019 San Carlos Lease"). The contractual term of the 2019 San Carlos Lease is 10.25 years from August 2021 until October 2031. The 2019 San Carlos Lease provides rent abatements and includes a one-time option to extend the lease term for five years. This option to extend the lease term was not determined to be reasonably certain and therefore has not been included in the Company's calculation of the associated operating lease liability under ASC 842.

The 2019 San Carlos Lease includes monthly base rent amounts escalating over the term of the lease. In addition, the lessor provided for a TIA of up to $14.7 million, which is expected to be fully utilized and are recorded in lease obligations.

The Company utilized its incremental borrowing rate to calculate the present value of the lease payments for the 2019 San Carlos Lease based on information available on November 1, 2020, the lease commencement date for accounting purposes, which was the date the Company was deemed to have obtained control of the premises. Calculation of the operating lease liability also included estimated future TIA reimbursements that had not yet been received as of the lease commencement date. TIA reimbursements received subsequent to lease commencement date are recorded as reductions to the operating lease liability.

Classification of Operating Leases

The 2018 Redwood City Lease and the 2019 San Carlos Lease required security deposits of $0.8 million and $1.5 million, respectively, which the Company satisfied by establishing letters of credit secured by restricted cash. Restricted cash related to the Company's lease agreements are recorded in other long-term assets on the Company's balance sheets.

Classification of the Company's operating lease liabilities included in the Company's balance sheets at December 31, 2021 and 2020 was as follows (in thousands):

	December 31,	
	2021	2020
Operating lease liabilities		
Current portion included in accrued expenses and other current liabilities	$ 2,316	$ 492
Operating lease liabilities, net of current portion	49,099	42,773
Total operating lease liabilities	$ 51,415	$ 43,265

The components of lease costs, which are included in operating expenses in the Company's statements of operations and comprehensive loss were as follows (in thousands):

	Year ended December 31,	
	2021	2020
Operating lease costs	$ 6,676	$ 2,087
Variable costs	1,663	364
Total lease costs	$ 8,339	$ 2,451

Variable costs included in the table above represent amounts the Company pays related to property taxes, insurance, maintenance and repair costs.

Cash paid for amounts included in the measurement of the Company's operating lease liabilities and presented within cash used in operating activities in the statements of cash flows was $1.7 million, $1.2 million and $0.5 million for the years ended December 31, 2021, 2020 and 2019.

Cash received for amounts related to tenant improvement allowances from lessors was $12.9 million, $0.2 million and $0 million for the years ended December 31, 2021, 2020 and 2019, respectively.

Operating Lease Obligations

Future lease payments required under operating leases included on the Company's balance sheet at December 31, 2021 are as follows (in thousands):

Fiscal Year Ending December 31,		
2022	$	7,445
2023		7,061
2024		7,273
2025		7,492
2026		7,716
Thereafter		40,677
Total future lease payments		77,664
Less:		
Present value adjustment		25,276
Present value of future lease incentives		973
Operating lease liabilities	$	51,415

Operating lease liabilities are based on the net present value of the remaining lease payments over the remaining lease term. In determining the present value of lease payments, the Company used its incremental borrowing rate based on the information available at the lease commencement date. As of December 31, 2021, the weighted-average remaining lease term of the Company's leases was 9.8 years and the weighted-average discount rate used to determine the operating lease liabilities included on the balance sheet was 8.5%.

As of December 31, 2021, the Company has not been party to any lease agreements containing material residual value guarantees or material restrictive covenants.

7. Commitments and Contingencies

As of December 31, 2021, the Company had $284.8 million noncancelable purchase commitments under various master service agreements primarily relating to our contract development and manufacturing organizations ("CDMOs"). Refer to Note 12 "Subsequent Events" for additional details.

Additionally, we enter into contracts in the normal course of business with clinical contract research organizations ("CROs"), clinical investigative sites and other counterparties assisting with our preclinical studies and clinical trials. Such contracts are generally cancellable, with varying provisions regarding termination. In the event of a contract being terminated, we would only be obligated for services received as of the effective date of the termination, along with cancellation fees, as applicable.

In-Licensing Agreements

The Company has entered into exclusive and non-exclusive, royalty bearing license agreements with third-parties for certain intellectual property. Under the terms of the license agreements, the Company is obligated to pay milestone payments upon the achievement of specified clinical, regulatory and commercial milestones. Research and development expense associated with the Company's milestone payments are recognized when such milestone has been achieved. Actual amounts due under the license agreements will vary depending on factors including, but not limited to, the number of products developed and the Company's ability to further develop and commercialize the licensed products. The Company is also subject to future royalty payments based on sales of the licensed products. In-licensing payments to third-parties for milestones are recognized as research and development expense in the period of achievement.

The Company did not recognize any milestone expense for the years ended December 31, 2021 and 2019. The Company recognized $3.4 million of milestone expense for the year ended December 31, 2020 related to development milestones associated with the first patient dosed in the Company's Phase 3 study with lirentelimab. Milestone payments are not creditable against royalties. As of December 31, 2021, the Company has not incurred any royalty liabilities related to its license agreements, as product sales have not yet commenced.

Exclusive License Agreement with The Johns Hopkins University

In December 2013, the Company entered into a license agreement with The Johns Hopkins University ("JHU") for a worldwide exclusive license to develop, use, manufacture and commercialize covered product candidates including lirentelimab, which was amended in September 30, 2016. Under the terms of the agreement, the Company has made upfront and milestone payments of $0.7 million through December 31, 2021 and may be required to make aggregate additional milestone payments of up to $1.8 million. The Company also issued 88,887 shares of common stock as consideration under the JHU license agreement. In addition to milestone payments, the Company is also subject to single-digit royalties to JHU based on future net sales of each licensed therapeutic product candidate by the Company and its affiliates and sublicensees, with up to a low six-digit dollar minimum annual royalty payment.

Non-exclusive License Agreement with BioWa Inc. and Lonza Sales AG

In October 2013, the Company entered into a tripartite agreement with BioWa Inc. ("BioWa"), and Lonza Sales AG ("Lonza"), for the non-exclusive worldwide license to develop and commercialize product candidates including lirentelimab that are manufactured using a technology jointly developed and owned by BioWa and Lonza. Under the terms of the agreement, the Company has made milestone payments of $3.4 million through December 31, 2020 and may be required to make aggregate additional milestone payments of up to $38.0 million. In addition to milestone payments, the Company is also subject to minimum annual commercial license fees of $40,000 per year to BioWa until such time as BioWa receives royalty payments, as well as low single-digit royalties to BioWa and to Lonza. Royalties are based on future net sales by the Company and its affiliates and sublicensees.

Indemnification Agreements

The Company has entered into indemnification agreements with certain directors and officers that require the Company, among other things, to indemnify them against certain liabilities that may arise by reason of their status or service as directors or officers. To date, no such matters have arisen and the Company does not believe that the outcome of any claims under indemnification arrangements will have a material adverse effect on its financial positions, results of operations or cash flows. Accordingly, the Company has not recorded a liability related to such indemnifications at December 31, 2021.

Legal Contingencies

On March 10, 2020, a putative securities class action complaint captioned Kim v. Allakos et al., No. 20-cv-01720 (N.D. Cal.) was filed in the United States District Court for the Northern District of California against the Company, its Chief Executive Officer, Dr. Robert Alexander, and its former Chief Financial Officer, Mr. Leo Redmond. The complaint asserts claims for violations of Sections 10(b) and 20(a) of the Securities Exchange Act of 1934 and Rule 10b-5 promulgated thereunder and seeks damages based on alleged material misrepresentations and omissions concerning its Phase 2 clinical trials of lirentelimab. The proposed class period is August 5, 2019, through December 17, 2019, inclusive. On August 28, 2020, the plaintiff filed an amended complaint, adding as defendants Adam Tomasi, the Company's President and Chief Operating Officer, and Henrik Rasmussen, the Company's former Chief Medical Officer. Given the early stage of this litigation matter, the Company cannot reasonably estimate a potential future loss or a range of potential future losses, if any, and has not recorded a contingent liability accrual as of December 31, 2021.

8. Stockholders' Equity

The Company's amended and restated certificate of incorporation filed on July 23, 2018 authorizes the issuance of a total of 220,000,000 shares of stock. Of these shares, 200,000,000 are designated as common stock and 20,000,000 are designated as preferred stock.

Common Stock

There were 54,622,363 shares of common stock issued and outstanding at December 31, 2021. Common shares reserved for future issuance upon the exercise, issuance or conversion of the respective equity instruments are as follows (in thousands):

	December 31,	
	2021	2020
Exercise of common stock options outstanding	5,530	6,616
Shares reserved for issuance under equity incentive plans	7,154	5,271
Vesting of restricted stock units	1,506	1,161
Shares reserved for issuance under employee stock purchase plans	1,766	1,265
Total	15,956	14,313

Common stockholders are entitled to dividends if and when declared by the Board of Directors subject to the prior rights of preferred stockholders. As of December 31, 2021, no dividends on common stock had been declared by the Board of Directors.

Preferred Stock

There were no shares of preferred stock issued and outstanding at December 31, 2021.

9. Stock-Based Compensation

Total stock-based compensation expense recognized is as follows (in thousands):

	Year Ended December 31,		
	2021	2020	2019
Research and development	$ 19,872	$ 11,583	$ 5,351
General and administrative	30,970	21,863	10,413
Total	$ 50,842	$ 33,446	$ 15,764

No income tax benefits for stock-based compensation expense have been recognized for the years ended December 31, 2021, 2020 and 2019 as a result of the Company's full valuation allowance applied to net deferred tax assets and net operating loss carryforwards.

Equity Incentive Plans

In July 2018, the Board of Directors adopted the 2018 Equity Incentive Plan (the "2018 Plan"). The 2018 Plan provides for the grant of incentive stock options, non-statutory stock options, restricted stock awards, restricted stock units ("RSUs"), stock appreciation rights, performance-based awards ("PSUs") and other stock-based awards. The number of shares of common stock that may be issued under the 2018 Plan will automatically increase on each January 1, beginning with the fiscal year ending December 31, 2019, equal to the least of (i) 5,000,000 shares, (ii) 5% of the outstanding shares of common stock as of the last day of the preceding fiscal year and (iii) such other amount as the Board of Directors may determine. Stock options and RSUs granted under the 2018 Plan generally vest over four years and expire no more than 10 years from the date of grant.

Following the IPO and upon the effectiveness of the 2018 Plan, the Company's 2012 Equity Incentive Plan, as amended, (the "2012 Plan"), terminated and no further awards will be granted thereunder. All outstanding awards under the 2012 Plan will continue to be governed by their existing terms. Any shares subject to awards granted under the 2012 Plan that, on or after the termination of the 2012 Plan, expire or terminate and shares previously issued pursuant to awards granted under the 2012 Plan that, on or after the termination of the 2012 Plan, are forfeited or repurchased by the Company will be transferred into the 2018 Plan. As of December 31, 2021, the maximum number of shares that may be added to the 2018 Plan pursuant to the preceding clause is 3,587,158 shares.

Prior to its termination, the 2012 Plan provided for the grant of stock options, stock appreciation rights, restricted stock and restricted stock units to employees, directors and consultants. Stock options granted under the 2012 Plan generally vest over four years and expire no more than 10 years from the date of grant.

As of December 31, 2021, the number of shares available for issuance under the 2018 Plan was 7,040,500.

Stock Options

Stock option activity under the 2018 Plan and the 2012 Plan during the year ended December 31, 2021 is summarized as follows (in thousands, except per share data):

	Options Outstanding	Weighted-Average Exercise Price	Weighted-Average Remaining Years	Aggregate Intrinsic Value
Balance at December 31, 2020	6,616	$ 15.53	7.1	$ 823,532
Authorized	—			
Granted	375	$ 94.89		
Exercised	(1,228)	$ 6.92		
Forfeited	(233)	$ 46.54		
Balance at December 31, 2021	5,530	$ 21.51	6.3	$ 25,750
Options exercisable	4,625	$ 13.12	5.9	$ 25,251
Options vested and expected to vest	5,514	$ 21.34	6.3	$ 25,749

The following weighted-average assumptions were used to calculate the fair value of stock options granted during the periods indicated:

	Year Ended December 31,		
	2021	2020	2019
Risk-free interest rate	1.01%	0.50%	1.91%
Expected volatility	70.40%	70.78%	67.22%
Expected dividend yield	—	—	—
Expected term (in years)	6.00	5.95	6.01

The weighted-average fair value of options granted during the years ended December 31, 2021, 2020 and 2019 was $59.00, $51.59 and $28.66 per share, respectively.

The aggregate fair value of stock options that vested during the years ended December 31, 2021, 2020 and 2019 was $17.1 million, $18.0 million and $12.6 million, respectively.

The aggregate intrinsic value of stock options is calculated as the difference between the exercise price of the stock options and the fair value of the Company's common stock for those stock options that had exercise prices lower than the fair value of the Company's common stock. Following the IPO, the aggregate intrinsic value represents the value of the Company's closing stock price on the last trading day of the year in excess of the weighted-average exercise price multiplied by the number of options outstanding or exercisable. The aggregate intrinsic value of stock options exercised during the years ended December 31, 2021, 2020 and 2019 was $109.2 million, $62.2 million and $55.8 million, respectively.

As of December 31, 2021, total unrecognized stock-based compensation expense relating to unvested stock options was $30.6 million. This amount is expected to be recognized over a weighted-average period of 2.6 years.

Restricted Stock Awards

The 2012 Plan allows for the issuance of restricted common stock and early exercise of unvested stock options in exchange for restricted common stock. Unvested shares of restricted common stock are subject to repurchase by the Company at the original issuance price in the event of the employee's termination, either voluntarily or involuntarily. Consideration received for unvested stock-based awards is initially recorded as a liability and subsequently reclassified into stockholders' deficit as the related awards vest.

There were no unvested shares of restricted common stock at December 31, 2021 and 2020. The fair value of restricted common stock that vested during the years ended December 31, 2021, 2020 and 2019 was $0, $0 and $20,000, respectively.

Time-based Restricted Stock Units

Each time-based restricted stock unit ("RSU") represents one equivalent share of our common stock to be awarded after satisfying the applicable continued service-based vesting criteria over a specified period. The fair value for these RSUs is based on the closing price of our common stock on the date of grant. The RSUs do not entitle participants to the rights of holders of common stock, such as voting rights, until the shares are issued. RSUs that are expected to vest are net of estimated future forfeitures.

RSU activity under the 2018 Plan is summarized as follows (in thousands, except per share data):

	Number of Shares	Weighted-Average Grant Date Fair Value
Balance at December 31, 2020	1,161	$ 102.24
Granted	833	$ 84.80
Vested	(285)	$ 100.11
Forfeited	(203)	$ 101.12
Balance at December 31, 2021	1,506	$ 93.14

The weighted-average fair value of RSUs granted during the year ended December 31, 2021, 2020 and 2019 was $84.80, $106.56 and $93.67, respectively.

As of December 31, 2021, total unrecognized stock-based compensation expense relating to unvested RSUs was $130.0 million and the weighted-average remaining vesting period was 3.2 years.

The aggregate intrinsic value of RSUs is calculated as the closing price per share of the Company's common stock on the last trading day of the fiscal period, multiplied by the number of RSUs expected to vest as of December 31, 2021. As of December 31, 2021, the aggregate intrinsic value of RSUs was $14.7 million.

Performance-based Restricted Stock Units

During the year ended December 31, 2021, the Compensation Committee of the Board of Directors approved awards of restricted stock units with performance-based vesting ("PSUs") from the 2018 Plan to certain executive officers. Each PSU represents one equivalent share of our common stock to be awarded upon vesting at the end of the performance periods, if specific performance goals set by the Compensation Committee of the Board of Directors are achieved. No PSUs will vest if the performance goals are not met. The fair value of these PSUs is based on the closing price of our common stock on the date of grant. The Company assesses the probability of achieving the performance goals on a quarterly basis. Changes in our assessment of the probability results in adjustments to stock-based compensation, which may include either a cumulative catch-up of expense or a reduction of expense depending on whether the likelihood of vesting has increased or decreased, that is recognized in the period such determination is made. The PSUs do not entitle participants to the rights of holders of common stock, such as voting rights, until the shares are issued. PSUs that are expected to vest are net of estimated future forfeitures.

The following table summarizes the PSUs activity for the year ended December 31, 2021 (in thousands, except per share data):

	Number of Shares	Weighted-Average Grant Date Fair Value
Balance at December 31, 2020	—	$ —
Granted	113	$ 79.60
Balance at December 31, 2021	113	$ 76.60

The Company did not grant any stock options or awards with performance-based or market-based vesting conditions during the years ended December 31, 2020 and 2019. As of December 31, 2021, the vesting of the PSUs was not deemed probable. Accordingly, no stock-based compensation expense related to these awards has been recognized during the year ended December 31, 2021. As of December 31, 2021, total unrecognized compensation expense relating to PSUs was $9.0 million over a weighted-average period of 2.2 years and the aggregate intrinsic value of PSUs was $1.1 million.

Employee Stock Purchase Plan

In July 2018, the Company's Board of Directors and stockholders approved the 2018 Employee Stock Purchase Plan (the "2018 ESPP"). The number of shares of common stock that may be issued under the 2018 ESPP shall automatically increase on each January 1, beginning with the fiscal year ending December 31, 2019, equal to the least of (i) 1,000,000 shares, (ii) 1% of the outstanding shares of common stock as of the last day of the immediately preceding fiscal year and (iii) such other amount determined by the 2018 ESPP administrator. As of December 31, 2021, the number of shares available for issuance under the 2018 ESPP was 1,765,958.

Under the 2018 ESPP, employees may purchase shares of the Company's common stock at a price per share equal to 85% of the lower of the fair market value of the common stock on the first trading day of the offering period or on the exercise date. The 2018 ESPP provides for consecutive, overlapping 24-month offering periods, each of which will include purchase periods. The first offering period commenced on July 18, 2018.

During the year ended December 31, 2021, 2020 and 2019, stock-based compensation related to the 2018 ESPP was $1.2 million, $0.9 million and $0.7 million, respectively.

The following weighted-average assumptions were used to calculate the fair value of ESPP shares during the periods indicated:

	Year Ended December 31,		
	2021	2020	2019
Risk-free interest rate	0.11%	0.58%	2.37%
Expected volatility	68.40%	61.80%	64.26%
Expected dividend yield	—	—	—
Expected term (in years)	1.20	1.20	1.22

As of December 31, 2021, total unrecognized compensation expense relating to shares to be purchased under the 2018 ESPP was $1.5 million over a weighted-average period of 1.3 years.

10. Income Taxes

The Company's deferred income tax assets include operating losses and tax credit carryforwards, as well as certain temporary differences between the carrying amounts of assets and liabilities for financial reporting purposes

and the amounts used for income tax purposes. Total deferred income tax assets, net of valuation allowance, at December 31, 2021 and 2020 were as follows (in thousands):

	December 31,	
	2021	2020
Deferred tax assets		
Net operating loss carryforwards	$ 157,277	$ 87,124
Research and development credits	33,341	18,139
Accruals and reserves	3,889	1,368
Stock-based compensation	4,932	5,661
Lease liability	10,854	9,151
Gross deferred tax assets	210,293	121,443
Less: valuation allowance	(203,516)	(112,680)
Deferred tax assets, net of valuation allowance	6,777	8,763
Deferred tax liabilities		
Fixed and intangible assets	84	360
Right-of-use asset	6,693	8,403
Gross deferred tax liabilities	6,777	8,763
Net deferred tax assets	$ —	$ —

Management has evaluated the positive and negative evidence surrounding the realizability of its deferred tax assets and has determined that it is more likely than not that the Company will not recognize the benefits of its federal and state deferred tax assets, and as a result, a valuation allowance of $203.5 million and $112.7 million has been established at December 31, 2021 and 2020, respectively. The change in the valuation allowance was $90.8 million and $52.8 million for the years ended December 31, 2021 and 2020, respectively. The Company has incurred net operating losses ("NOL") since inception. As of December 31, 2021, the Company had federal and state NOL carryforwards of $715.5 million and $95.1 million, respectively. Federal NOL carryforwards of $653.6 million, which were generated after December 31, 2017, do not expire. The remaining $61.9 million of Federal NOL carryforwards expire beginning in 2032. As of December 31, 2021, the Company had federal and California research and other tax credit carryforwards of $38.4 million and $8.0 million, respectively. The federal tax credits expire beginning in 2033. The California tax credits can be carried forward indefinitely.

The Internal Revenue Code of 1986, as amended (the "Code"), provides for a limitation of the annual use of net operating losses and other tax attributes (such as research and development tax credit carryforwards) following certain ownership changes defined by the Code that could limit the Company's ability to utilize these carryforwards in the future. The Company may have experienced or may in the future experience ownership changes, as defined by the Code and may not be able to take full advantage of these carryforwards for federal or state income tax purposes.

The effective tax rate for the years ended December 31, 2021 and 2020 is different from the federal statutory rate primarily due to the valuation allowance against deferred tax assets as a result of insufficient income. The Company's effective tax rate differs from the federal statutory tax rate as follows:

	Year Ended December 31,	
	2021	2020
Federal statutory tax rate	21.0%	21.0%
Change in deferred tax asset valuation allowance	(33.7)%	(34.4)%
State taxes, net of federal benefit	1.9%	0.8%
Research and development tax credits	5.2%	5.6%
Stock-based compensation	6.9%	6.9%
Other	(1.3)%	0.1%
Effective tax rate	—%	—%

Uncertain Tax Positions

The Company accounts for its uncertain tax positions in accordance with FASB ASC Topic No. 740-10, *Accounting for Uncertainty in Income Taxes* ("ASC 740-10"). Per ASC 740-10, the Company determines its uncertain tax positions based on a determination of whether and how much of a tax benefit taken by the Company in its tax filings is more likely than not to be sustained upon examination by the relevant income tax authorities.

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

	Year Ended December 31,	
	2021	2020
Balance at the beginning of the year	$ 6,932	$ 3,545
Increase related to current year tax positions	5,345	3,387
Increase related to prior year tax positions	(324)	—
Balance at the end of the year	$ 11,953	$ 6,932

The entire amount of the unrecognized tax benefits would not impact the Company's effective tax rate if recognized. During the years ended December 31, 2021 and 2020, the Company did not recognize accrued interest and penalties related to unrecognized tax benefits. The Company does not anticipate that the amount of existing unrecognized tax benefits will significantly increase or decrease during the next twelve months.

The Company files income tax returns in the U.S. federal and multiple state tax jurisdictions. The federal and state income tax returns from inception to December 31, 2021 remain subject to examination.

During the third quarter of 2020, the U.S. Internal Revenue Service ("IRS") commenced an examination of the Company's federal corporate income tax return for the year ended December 31, 2018. The Company believes that it has adequately provided for any adjustments that may result from the IRS examination, however, the outcome of tax examinations cannot be predicted with certainty. The examination was not yet completed as of December 31, 2021.

It is the Company's policy to include penalties and interest expense related to income taxes as a component of the income tax provision as necessary. Management determined that no accrual for interest and penalties was required at December 31, 2021 and 2020. Since the Company is in a loss carryforward position, it is generally subject to examination by the U.S. federal, state and local income tax authorities for all tax years in which a loss carryforward is available.

11. Defined Contribution Plans

In January 2018, the Company established a defined contribution plan under Section 401(k) of the Internal Revenue Code (the "401(k) plan"). The 401(k) plan covers all employees who meet defined minimum age and service requirements. Employee contributions are voluntary and are determined on an individual basis, limited to the maximum amount allowable under U.S. federal tax regulations. The Company makes matching contributions of up to 4% of the eligible employees' compensation to the 401(k) plan. During the years ended December 31, 2021, 2020 and 2019, the Company made contributions to the 401(k) plan of $0.7 million, $0.7 million and $0.5 million, respectively.

12. Subsequent Events

In February 2022, we began implementing a reorganization plan to reduce operating costs, contractual commitments and better align our workforce with the clinical development plans of our business (the "Reorganization Plan").

Vendor Termination Agreement

Approximately $231.2 million of the $284.8 million total noncancellable purchase obligations as of December 31, related to various manufacturing services agreements with Lonza AG or affiliates (such agreements, the "MSAs") On February 14, 2022 (the "Effective Date"), the Company entered into a termination agreement (the "Termination

Agreement") with Lonza AG, Lonza Sales Ltd and Lonza Sales AG (collectively, "Lonza") regarding all outstanding manufacturing service agreements. Lonza will continue to provide certain services to us, including completion of cGMP batches already underway and other services to assist with the transition post-termination. The Termination Agreement provides that the Company shall pay approximately $136.1 million (126 million Swiss Francs) (the "Termination Amount") to Lonza as a result of such termination, 95% of which is to be paid within 30 days after the Effective Date, and 5% of which is be paid within 30 days of the release of the remaining cGMP batches. If the Company fails to pay the first 95% of the Termination Amount to Lonza within 30 days of the Effective Date, Lonza may at its option give notice to the Company that the Termination Agreement is terminated. The Termination Agreement contains mutual releases by all parties thereto, for all claims known and unknown, relating and arising out of, or connected with, the MSAs and the subject matter(s) thereof, subject to certain exceptions.

In addition, Lonza held or had placed orders for raw materials to be used in the course of services Lonza was to provide to the Company. Pursuant to the Termination Agreement, the cost of such raw materials is included in the Termination Amount. Although the Company will hold title to such raw materials and may repurpose where possible, the recoverable value, if any, is currently not estimable.

As the agreement was terminated on February 14, 2022, there was no impact of the termination agreement to the financial statements for the year ended December 31, 2021. The Company is still evaluating the impact of the termination agreement to our 2022 financial statements including the total amount and value, if any, of raw materials and its ability to utilize or repurpose such materials and the total value of services remaining to be rendered. However, the Company expects that the termination will result in a charge to our financial statements in amounts totaling up to $137 million during 2022.

Employment Related Subsequent Events

Under the plan, the Company is reducing its workforce by approximately 35%. Impacted employees received notice that their positions will be eliminated on February 16, 2022. At the time of departure from the Company, impacted employees are eligible to receive severance benefits and Company funded COBRA premiums, contingent upon an impacted employee's execution (and non-revocation) of a customary separation agreement, which includes a general release of claims against the Company.

In connection with the Reorganization Plan, the Company estimates that it will incur aggregate restructuring charges of approximately $5.3 million, which will be recognized primarily in the first quarter of 2022, related to severance payments and other employee-related separation costs. The Company may also incur additional costs not currently contemplated due to events that may occur as a result of, or that are associated with, the reduction in workforce.

In addition, the Board determined that it is in the best interests of the Company and its stockholder to put in place arrangements designed to provide that the Company will have the continued dedication and commitment of those employees, including executives, determined to be key to the planned go-forward operations. The Board approved, and management has implemented a retention program for employees staying with the company and includes cash retention bonuses totaling approximately $3 million for certain retained employees and grants of RSUs totaling 8.2 million awards in aggregate to all employees. Half of these RSUs are time-based RSUs with four-year vesting and half are performance-based with full vesting in the event that the Company achieves all primary endpoints in any of its Phase 2/3 clinical studies other than the Phase 3 Eosinophilic Duodenitis study expected to readout data in Q3 2022.

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

None.

Item 9A. Controls and Procedures.

Evaluation of Disclosure Controls and Procedures

Our management, with the participation of our Chief Executive Officer and our President, Chief Operating Officer and Chief Financial Officer, evaluated the effectiveness of our disclosure controls and procedures as defined in Rules 13a-15(e) and 15d-15(e) of the Exchange Act. Disclosure controls and procedures include, without limitation, controls and procedures designed to ensure that information required to be disclosed by a company in the reports that it files or submits under the Exchange Act is accumulated and communicated to management, including our principal executive and principal financial officers, as appropriate to allow timely decisions regarding required disclosure. Based on this evaluation, our Chief Executive Officer and President, Chief Operating Officer and Chief Financial Officer concluded that the design and operation of our disclosure controls and procedures were effective at the reasonable assurance level as of December 31, 2021.

Management's Annual Report on Internal Control over Financial Reporting

Our management is responsible for establishing and maintaining adequate internal control over financial reporting, as such term is defined in Exchange Act Rules 13a-15(f) and 15d-15(f). Internal control over financial reporting includes those policies and procedures that (i) pertain to the maintenance of records that, in reasonable detail, accurately and fairly reflect the transactions and dispositions of our assets; (ii) provide reasonable assurance that transactions are recorded as necessary to permit preparation of the financial statements in accordance with generally accepted accounting principles, and that receipts and expenditures are being made only in accordance with authorizations of our management and directors; and (iii) provide reasonable assurance regarding prevention or timely detection of unauthorized acquisition, use, or disposition of our assets that could have a material effect on the financial statements.

Our management, with the participation of our principal executive officer and principal financial officer, conducted an evaluation of the effectiveness of our internal control over financial reporting based on criteria established in the *Internal Control–Integrated Framework (2013)* issued by the Committee of Sponsoring Organizations of the Treadway Commission. Based on this evaluation, our management concluded that our internal controls over financial reporting were effective as of December 31, 2021.

The effectiveness of our internal control over financial reporting as of December 31, 2021 has also been audited by Ernst & Young LLP, an independent registered public accounting firm, as stated in its report included in this Annual Report on Form 10-K.

Inherent Limitations on the Effectiveness of Internal Control

Management recognizes that any controls and procedures, no matter how well designed and operated, can provide only reasonable assurance of achieving their objectives, and management necessarily applies its judgment in evaluating the cost-benefit relationship of possible controls and procedures.

Changes in Internal Control over Financial Reporting

There was no change in our internal control over financial reporting identified in connection with the evaluation required by Rule 13a-15(d) and 15d-15(d) of the Exchange Act that occurred during the fourth quarter of the year ended December 31, 2021 that has materially affected, or is reasonably likely to materially affect, our internal control over financial reporting.

Report of Independent Registered Public Accounting Firm

To the Stockholders and the Board of Directors of Allakos Inc.

Opinion on Internal Control Over Financial Reporting

We have audited Allakos Inc. ‘s internal control over financial reporting as of December 31, 2021, based on criteria established in Internal Control—Integrated Framework issued by the Committee of Sponsoring Organizations of the Treadway Commission (2013 framework) (the COSO criteria). In our opinion, Allakos Inc. maintained, in all material respects, effective internal control over financial reporting as of December 31, 2021, based on the COSO criteria.

We also have audited, in accordance with the standards of the Public Company Accounting Oversight Board (United States) (“PCAOB”), the balance sheets of the Company as of December 31, 2021 and 2020, the related statements of operations and comprehensive loss, statements of stockholders' equity and cash flows for each of the three years in the period ended December 31, 2021, and the related notes and our report dated March 1, 2022 expressed an unqualified opinion thereon.

Basis for Opinion

The Company’s management is responsible for maintaining effective internal control over financial reporting and for its assessment of the effectiveness of internal control over financial reporting included in the accompanying Management's Annual Report on Internal Control Over Financial Reporting. Our responsibility is to express an opinion on the Company’s internal control over financial reporting based on our audit. 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 audit in accordance with the standards of the PCAOB. Those standards require that we plan and perform the audit to obtain reasonable assurance about whether effective internal control over financial reporting was maintained in all material respects.

Our audit included obtaining an understanding of internal control over financial reporting, assessing the risk that a material weakness exists, testing and evaluating the design and operating effectiveness of internal control based on the assessed risk, and performing such other procedures as we considered necessary in the circumstances. We believe that our audit provides a reasonable basis for our opinion.

Definition and Limitations of Internal Control Over Financial Reporting

A company’s internal control over financial reporting is a process designed to provide reasonable assurance regarding the reliability of financial reporting and the preparation of financial statements for external purposes in accordance with generally accepted accounting principles. A company’s internal control over financial reporting includes those policies and procedures that (1) pertain to the maintenance of records that, in reasonable detail, accurately and fairly reflect the transactions and dispositions of the assets of the company; (2) provide reasonable assurance that transactions are recorded as necessary to permit preparation of financial statements in accordance with generally accepted accounting principles, and that receipts and expenditures of the company are being made only in accordance with authorizations of management and directors of the company; and (3) provide reasonable assurance regarding prevention or timely detection of unauthorized acquisition, use, or disposition of the company’s assets that could have a material effect on the financial statements.

Because of its inherent limitations, internal control over financial reporting may not prevent or detect misstatements. Also, projections of any evaluation of effectiveness to future periods are subject to the risk that controls may become inadequate because of changes in conditions, or that the degree of compliance with the policies or procedures may deteriorate.

/s/ Ernst & Young LLP

Redwood City, California
March 1, 2022

Item 9B. Other Information.

This disclosure set forth below is provided in lieu of a separate Form 8-K filing pursuant to Item 1.02 of Form 8-K.

The Sales Agreement, dated May 10, 2021, between the Company and Cowen and Company, LLC was terminated effective February 24, 2022.

The disclosure set forth below is provided in lieu of a separate Form 8-K filing pursuant to Item 5.02 of Form 8-K.

On February 25, 2022, the Board of Directors (the "Board") of Allakos Inc. ("Allakos" or the "Company") approved a grant of (1) 1,058,646 restricted stock units ("RSUs") to Dr. Robert Alexander, our Chief Executive Officer, (2) 475,216 RSUs to H. Baird Radford, III, our Chief Financial Officer, (3) 688,120 RSUs to Dr. Adam Tomasi, our President and Chief Operating Officer, and (4) 280,980 RSUs to Mark Asbury, our Chief Legal Officer and General Counsel, effective as of February 25, 2022 (the "Grant Date"). Each individual's RSU grant vests as follows:

- 50% of such individual's RSUs are subject to time-based vesting, with 25% of these time-based RSUs vesting on March 1, 2023, and the remainder vesting in 12 equal installments on each three-month anniversary of the Grant Date thereafter; and
- 50% of such individual's RSUs are subject to performance-based vesting, with all of these performance-based RSUs vesting upon the first completion of any of the Company's Phase 2 or Phase 3 studies of lirentelimab (other than the Company's eosinophilic duodenitis-only study, which was commenced in 2021), provided that the study meets its primary endpoints.

Item 9C. Disclosure Regarding Foreign Jurisdictions that Prevent Inspections.

Not applicable.

PART III

Item 10. Directors, Executive Officers and Corporate Governance.

The information required under this item is incorporated herein by reference to our definitive proxy statement pursuant to regulation 14A, or the Proxy Statement, which proxy statement is expected to be filed with Securities and Exchange Commission not later than 120 days after the close of our fiscal year ended December 31, 2021.

Item 11. Executive Compensation.

The information required by this item will be set forth in the Proxy Statement and is incorporated herein by reference.

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

The information required by this item will be set forth in the Proxy Statement and is incorporated herein by reference.

Item 13. Certain Relationships and Related Transactions, and Director Independence.

The information required by this item will be set forth in the Proxy Statement and is incorporated herein by reference.

Item 14. Principal Accounting Fees and Services.

The information required by this item will be set forth in the Proxy Statement and is incorporated herein by reference.

PART IV

Item 15. Exhibits, Financial Statement Schedules.

(a) The following documents are filed as part of this Annual Report on Form 10-K:

(1) Financial Statements

See Index to Financial Statements included in Part II Item 8 of this Annual Report on Form 10-K

(2) Financial Statement Schedules

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

(3) List of Exhibits required by Item 601 of Regulation S-K

Exhibit Number	Description	Incorporated by Reference				Filed Herewith
		Form	File No.	Number	Filing Date	
3.1	Amended and Restated Certificate of Incorporation of the Registrant.	8-K	001-38582	3.1	7/24/2018	
3.2	Amended and Restated Bylaws of the Registrant.	8-K	001-38582	3.2	7/24/2018	
4.1	Amended and Restated Investors' Rights Agreement among the Registrant and certain of its stockholders, dated November 30, 2017.	S-1/A	333-225836	4.1	6/22/2018	
4.2	Specimen common stock certificate of the Registrant.	S-1/A	333-225836	4.2	7/09/2018	
4.3	Description of Securities Registered Pursuant to Section 12 of the Securities Exchange Act of 1934.					X
10.1+	Form of Indemnification Agreement between the Registrant and each of its directors and executive officers.	S-1	333-225836	10.1+	6/22/2018	
10.2+	2012 Equity Incentive Plan, as amended, and forms of agreement thereunder.	S-1	333-225836	10.2+	6/22/2018	
10.3+	2018 Equity Incentive Plan and forms of agreements thereunder.	S-1/A	333-225836	10.3+	7/09/2018	
10.4+	2018 Employee Stock Purchase Plan.	S-1/A	333-225836	10.4	7/09/2018	
10.5+	Employment Letter between the Registrant and Robert Alexander, Ph.D.	S-1/A	333-225836	10.5+	7/09/2018	
10.6+	Employment Letter between the Registrant and Adam Tomasi, Ph.D.	S-1/A	333-225836	10.6+	7/09/2018	
10.7+	Employment Letter between the Registrant and Henrik Rasmussen, M.D., Ph.D.	S-1/A	333-225836	10.7+	7/09/2018	
10.8+	Employment Letter between the Registrant and Harlan Baird Radford, III.	10-Q		10.1	5/10/2021	
10.9+	Executive Incentive Compensation Plan.	S-1	333-225836	10.9+	6/22/2018	
10.10+	Outside Director Compensation Policy.	S-1/A	333-225836	10.10+	7/09/2018	
10.11+	Amended and Restated Outside Director Compensation Policy.	10-Q		10.2+	5/11/2020	

10.12+	Change in Control and Severance Policy.	S-1/A	333-225836	10.11+	7/09/2018	
10.13	Lease Agreement between the Registrant and Westport Office Park, LLC, dated January 4, 2018, as amended.	S-1	333-225836	10.12	6/22/2018	
10.14	Lease Agreement between the Registrant and ARE-San Francisco No. 63, LLC, dated December 4, 2019.	10-K		10.13	2/25/2020	
10.15#	Non-exclusive License Agreement between the Registrant, BioWa, Inc. and Lonza Sales AG, dated October 31, 2013.	S-1/A	333-225836	10.14#	7/17/2018	
10.16#	Amended and Restated Exclusive License Agreement between the Registrant and the Johns Hopkins University, dated September 30, 2016.	S-1/A	333-225836	10.15#	7/17/2018	
10.17#	Commercial Supply Agreement between the Registrant and Lonza Sales AG, dated April 7, 2020.	10-Q		10.1#	5/11/2020	
10.18#	Commercial Supply Agreement between the Registrant and Lonza Sales AG, dated December 18, 2020.	10-K		10.19#	3/1/2021	
10.19#	Termination Agreement between the Registrant and Lonza AG and affiliates thereof, dated February 14, 2022.					X
10.20	Sales Agreement between the Registrant and Cowen and Company, LLC, dated May 10, 2021.	8-K		1.1	5/10/2021	
10.21	Notice of Termination of Sales Agreement between the Registrant and Cowen and Company, LLC, dated February 24, 2022.					X
23.1	Consent of Independent Registered Public Accounting Firm.					X
31.1	Certification of Principal Executive Officer Pursuant to Rules 13a-14(a) and 15d-14(a) under the Securities Exchange Act of 1934, as Adopted Pursuant to Section 302 of the Sarbanes-Oxley Act of 2002.					X
31.2	Certification of Principal Financial Officer Pursuant to Rules 13a-14(a) and 15d-14(a) under the Securities Exchange Act of 1934, as Adopted Pursuant to Section 302 of the Sarbanes-Oxley Act of 2002.					X
32.1*	Certification of Principal Executive Officer Pursuant to 18 U.S.C. Section 1350, as Adopted Pursuant to Section 906 of the Sarbanes-Oxley Act of 2002.					X
32.2*	Certification of Principal Financial Officer Pursuant to 18 U.S.C. Section 1350, as Adopted Pursuant to Section 906 of the Sarbanes-Oxley Act of 2002.					X

101.INS	Inline XBRL Instance Document - the instance document does not appear in the Interactive Data File because its XBRL tags are embedded within the Inline XBRL document.	X
101.SCH	Inline XBRL Taxonomy Extension Schema Document	
101.CAL	Inline XBRL Taxonomy Extension Calculation Linkbase Document	X
101.DEF	Inline XBRL Taxonomy Extension Definition Linkbase Document	X
101.LAB	Inline XBRL Taxonomy Extension Label Linkbase Document	X
101.PRE	Inline XBRL Taxonomy Extension Presentation Linkbase Document	X
104	Cover Page Interactive Data File (formatted in Inline XBRL)	X

* Furnished herewith.
+ Indicated management contract or compensatory plan.
# Portions of this exhibit (indicated by asterisks) have been omitted pursuant to a request for confidential treatment and this exhibit has been filed separately with the SEC.

Item 16. Form 10-K Summary

None.

SIGNATURES

Pursuant to the requirements of Section 13 or 15(d) of the Securities Exchange Act of 1934, as amended, the Registrant has duly caused this Report to be signed on its behalf by the undersigned, thereunto duly authorized**.**

ALLAKOS INC.

Date: March 1, 2022

By: /s/ Robert Alexander
Robert Alexander, Ph.D.
Chief Executive Officer
(Principal Executive Officer)

Pursuant to the requirements of the Securities Exchange Act of 1934, as amended, this Report has been signed below by the following persons on behalf of the Registrant in the capacities and on the dates indicated.

Name	Title	Date
/s/ Robert Alexander **Robert Alexander, Ph.D.**	Chief Executive Officer and Director *(Principal Executive Officer)*	March 1, 2022
/s/ H. Baird Radford, III **H. Baird Radford, III**	Chief Financial Officer *(Principal Financial and Accounting Officer)*	March 1, 2022
/s/ Daniel Janney **Daniel Janney**	Chair of the Board	March 1, 2022
/s/ Robert E. Andreatta **Robert E. Andreatta**	Director	March 1, 2022
/s/ Steven P. James **Steven P. James**	Director	March 1, 2022
/s/ John McKearn **John McKearn, Ph.D.**	Director	March 1, 2022
/s/ Paul Walker **Paul Walker**	Director	March 1, 2022

Exhibit 4.3

DESCRIPTION OF SECURITIES
REGISTERED PURSUANT TO SECTION 12 OF
THE SECURITIES EXCHANGE ACT OF 1934

As of December 31, 2021, Allakos Inc. (the "Company", "our", "us", or "we") had one class of securities registered under Section 12 of the Securities Exchange Act of 1934, as amended (the "Exchange Act"): common stock, par value $0.001 per share. The Company's common stock is listed on The Nasdaq Global Select Market under the trading symbol "ALLK".

DESCRIPTION OF CAPITAL STOCK

The following is a description of our capital stock and certain provisions of our amended and restated certificate of incorporation and amended and restated bylaws. The following description may not contain all of the information that is important to you. To understand the material terms of our common stock, you should read our amended and restated certificate of incorporation and amended and restated bylaws, copies of which have been filed with the Securities and Exchange Commission ("SEC").

Authorized Capital Stock

The Company's authorized capital stock consists of 200,000,000 shares of common stock, par value $0.001 and 20,000,000 shares of preferred stock, par value $0.001 per share. As of December 31, 2021, we had 54,622,363 shares of our common stock issued and outstanding and no shares of preferred stock issued and outstanding.

Common Stock

Fully Paid and Nonassessable

All of the outstanding shares of the Company's common stock are fully paid and nonassessable.

Voting Rights

Each holder of common stock is entitled to one vote for each share on all matters submitted to a vote of the stockholders, including the election of directors. Our certificate of incorporation and bylaws do not provide for cumulative voting rights. Because of this, the holders of a plurality of the shares of common stock entitled to vote in any election of directors can elect all of the directors standing for election, if they should so choose. With respect to matters other than the election of directors, at any meeting of the stockholders at which a quorum is present or represented, the affirmative vote of a majority of the voting power of the shares present in person or represented by proxy at such meeting and entitled to vote on the subject matter shall be the act of the stockholders, except as otherwise required by law. The holders of a majority of the stock issued and outstanding and entitled to vote, present in person or represented by proxy, shall constitute a quorum for the transaction of business at all meetings of the stockholders.

Dividend Rights

Subject to preferences that may be applicable to any then-outstanding preferred stock, holders of our common stock are entitled to receive dividends, if any, as may be declared from time to time by our board of directors out of legally available funds.

Right to Receive Liquidation Distributions

In the event of our liquidation, dissolution or winding up, holders of our common stock will be entitled to share ratably in the net assets legally available for distribution to stockholders after the payment of all of our debts and other liabilities and the satisfaction of any liquidation preference granted to the holders of any then-outstanding shares of preferred stock.

Rights and Preferences

Holders of our common stock have no preemptive, conversion, subscription or other rights, and there are no redemption or sinking fund provisions applicable to our common stock. The rights, preferences and privileges of the holders of our common stock are subject to and may be adversely affected by the rights of the holders of shares of any series of preferred stock that we may designate in the future.

DESCRIPTION OF PREFERRED STOCK

Our board of directors has the authority, without further action by the stockholders, to issue up to 20,000,000 shares of preferred stock in one or more series and to fix the rights, preferences, privileges and restrictions thereof. These rights, preferences and privileges could include dividend rights, conversion rights, voting rights, redemption rights, liquidation preferences, sinking fund terms and the number of shares constituting any series or the designation of such series, any or all of which may be greater than the rights of our common stock. The issuance of preferred stock could adversely affect the voting power of holders of our common stock and the likelihood that such holders will receive dividend payments and payments upon liquidation. In addition, the issuance of preferred stock could have the effect of delaying, deferring or preventing change in our control or other corporate action. No shares of preferred stock are outstanding.

ANTI-TAKEOVER EFFECTS OF CERTAIN PROVISIONS OF DELAWARE LAW, OUR AMENDED AND RESTATED CERTIFICATE OF INCORPORATION AND OUR AMENDED AND RESTATED BYLAWS

Certain provisions of Delaware law and certain provisions in our amended and restated certificate of incorporation and amended and restated bylaws summarized below may be deemed to have an anti-takeover effect and may delay, deter or prevent a tender offer or takeover attempt that a stockholder might consider to be in its best interests, including attempts that might result in a premium being paid over the market price for the shares held by stockholders.

Preferred Stock

Our amended and restated certificate of incorporation contains provisions that permit our board of directors to issue, without any further vote or action by the stockholders, shares of preferred stock in one or more series and, with respect to each such series, to fix the number of shares constituting the series and the designation of the series, the voting rights (if any) of the shares of the series and the powers, preferences or relative, participation, optional and other special rights, if any, and any qualifications, limitations or restrictions, of the shares of such series.

Classified Board

Our amended and restated certificate of incorporation provides that our board of directors is divided into three classes, designated Class I, Class II and Class III. Each class is an equal number of directors, as nearly as possible, consisting of one-third of the total number of directors constituting the entire board of directors. The term of the Class I directors will terminate on the date of the 2022 annual meeting, the term of the Class II directors shall terminate on the date of the 2023 annual meeting and the term of the Class III directors shall terminate on the date of the 2024 annual meeting. At each annual meeting of stockholders, successors to the class of directors whose term expires at that annual meeting will be elected for a three-year term.

Removal of Directors

Our amended and restated certificate of incorporation provides that stockholders may only remove a director for cause by a vote of no less than a majority of the shares present in person or by proxy at the meeting and entitled to vote.

Director Vacancies

Our amended and restated certificate of incorporation authorizes only our board of directors to fill vacant directorships.

No Cumulative Voting

Our amended and restated certificate of incorporation provides that stockholders do not have the right to cumulate votes in the election of directors.

Special Meetings of Stockholders

Our amended and restated certificate of incorporation and amended and restated bylaws provide that, except as otherwise required by law, special meetings of the stockholders may be called only by an officer at the request of a majority of our board of directors, by the Chair of our board of directors or by our Chief Executive Officer.

Advance Notice Procedures for Director Nominations

Our bylaws provide that stockholders seeking to nominate candidates for election as directors at an annual or special meeting of stockholders must provide timely notice thereof in writing. To be timely, a stockholder's notice generally will have to be delivered to and received at our principal executive offices before notice of the meeting is issued by the secretary of the company, with such notice being served not less than 90 nor more than 120 days before the meeting. Although the amended and restated bylaws do not give the board of directors the power to approve or disapprove stockholder nominations of candidates to be elected at an annual meeting, the amended and restated bylaws may have the effect of precluding the conduct of certain business at a meeting if the proper procedures are not followed or may discourage or deter a potential acquirer from conducting a solicitation of proxies to elect its own slate of directors or otherwise attempting to obtain control of the company.

Action by Written Consent

Our amended and restated certificate of incorporation and amended and restated bylaws provide that any action to be taken by the stockholders must be effected at a duly called annual or special meeting of stockholders and may not be effected by written consent.

Amending our Certificate of Incorporation and Bylaws

Our amended and restated certificate of incorporation may be amended or altered in any manner provided by the Delaware General Corporation Law ("DGCL"). Our amended and restated bylaws may be adopted, amended, altered or repealed by stockholders only upon approval of at least majority of the voting power of all the then outstanding shares of the common stock, except for any amendment of the above provisions, which would require the approval of a two-thirds majority of our then outstanding common stock. Our amended and restated certificate of incorporation provides that our bylaws may be amended, altered or repealed by the board of directors.

Authorized but Unissued Shares

Our authorized but unissued shares of common stock and preferred stock will be available for future issuances without stockholder approval, except as required by the listing standards of NASDAQ, and could be utilized for a variety of corporate purposes, including future offerings to raise additional capital, acquisitions and employee benefit plans. The existence of authorized but unissued and unreserved common stock and preferred stock could render more difficult or discourage an attempt to obtain control of the company by means of a proxy contest, tender offer, merger or otherwise.

Exclusive Jurisdiction

Our amended and restated certificate of incorporation provides that, unless we consent to the selection of an alternative forum, the Court of Chancery of the State of Delaware shall be the sole and exclusive forum for any derivative action or proceeding brought on our behalf, any action asserting a claim of breach of fiduciary duty, any action asserting a claim arising pursuant to the DGCL, any action regarding our amended and restated certificate of

incorporation or our amended and restated bylaws, or any action asserting a claim against us that is governed by the internal affairs doctrine. Our amended and restated certificate of incorporation provides further that the federal district courts of the United States of America is the exclusive forum for resolving any complaint asserting a cause of action arising under the Securities Act. However, it is possible that a court could find our forum selection provisions to be inapplicable or unenforceable.

LISTING

Our common stock is listed on the NASDAQ under the symbol “ALLK.”

Exhibit 10.19

CERTAIN CONFIDENTIAL INFORMATION CONTAINED IN THIS DOCUMENT, MARKED BY BRACKETS ([***]), HAS BEEN OMITTED BECAUSE THE INFORMATION IS NOT MATERIAL AND IS THE TYPE OF INFORMATION THAT THE REGISTRANT TREATS AS PRIVATE OR CONFIDENTIAL.

DATED

14 February 2022

TERMINATION WIND-DOWN AND SETTLEMENT AGREEMENT

among

Lonza AG

and

Lonza Sales AG

and

Allakos Inc.

CONTENTS

CLAUSE

EXHIBITS

This Termination Wind-Down and Settlement Agreement (this "Termination Agreement") is dated 14th February 2022 ("Effective Date")

Parties

(1) Lonza AG, Münchensteinerstrasse 38, CH-4002 Basel, Switzerland ("Lonza AG")

(2) Lonza Sales AG, Münchensteinerstrasse 38, CH-4002 Basel, Switzerland ("Lonza Sales AG" also referred to as Lonza Sales Ltd.) and, collectively with Lonza AG, "Lonza")

(3) Allakos Inc., 975 Island Drive, Suite 201, Redwood City, CA 94065 ("Allakos")

Lonza and Allakos collectively the "parties" and each a "party."

Stipulations

Each of the Parties stipulates and agrees to the following:

(A) Allakos and Lonza are parties to certain MSAs (as defined below) pursuant to which Allakos has committed to purchase, and Lonza has agreed to manufacture and supply, certain minimum amounts of materials, as more fully specified therein (the "Obligations").

(B) Each party has duly performed all of its obligations under the MSAs, and is ready, willing and able to continue to perform for the remainder of the term of each of the MSAs.

(C) Allakos desires to terminate and wind-down the MSAs for business and economic reasons of Allakos.

(D) If Allakos were to cancel all of the various Batches and Services under the MSA as permitted by the MSAs, the resulting Cancellation Fees and other amounts owned to Lonza under the MSAs would be an amount substantially in excess of the Termination Amount (the "Aggregate Cancellation Amount").

(E) Lonza has agreed to consent to the wind-down and early termination of the MSAs by Allakos in exchange for an immediate and indefeasible payment upon the terms set forth herein, and Allakos has agreed to make such payment in exchange for a relief from any further or additional liability of Allakos to Lonza under the MSAs.

(F) Allakos acknowledges that this Termination Agreement and its performance provides substantial value and benefits to Allakos insofar as the early and orderly termination of the MSAs relieves Allakos of future payment obligations to Lonza in amounts materially greater than the Termination Amount.

(G) The Parties have therefore agreed to terms for the full and final settlement on a binding basis as set forth in this Termination Agreement.

Agreed terms

1. Definitions and interpretation

In this Termination Agreement, unless the context otherwise requires, the following words and expressions have the following meanings:

MSAs: collectively, the following manufacturing and other services agreements, including all Binding Orders, Forecasts, Project Plans, SOWs, and other documents and/or agreements issued, executed, and/or agreed upon under and/or pursuant thereto, and all exhibits, appendices, and attachments to any of the foregoing (as all have been amended through the Effective Date):

a) Development and Manufacturing Services Agreement dated 01Oct2013 (the "1K DMSA");

b) BLA Services and Manufacturing Services Agreement dated 01Dec17 (the "BLA Agreement");

c) 2k Development and Manufacturing Services Agreement dated 01Nov2019 (the "2k DMSA");

d) 1k Commercial Supply Agreement dated 02Apr2020 (the "1k CSA"); and

e) 2k Commercial Supply Agreement dated 27Nov2020 (the "2k CSA").

Related Parties: a party's direct and indirect parents, subsidiaries, affiliates, predecessors, successors, assigns, and/or transferees, and each of their respective employees, principals, agents, officers, directors, and/or other representatives.

Other capitalised terms shall have the meaning given in the relevant MSA.

2. Effect of this Termination Agreement

2.1 The parties hereby agree that upon its execution this Termination Agreement shall immediately be fully and effectively binding on each of them.

2.2 Each MSA shall terminate as of the Effective Date. Such terminations are via mutual agreement of the parties, and not due to any party's breach. Notwithstanding the foregoing but subject to clause 2.4, Lonza shall continue to perform and provide the Services as detailed in Exhibit A (the "On-Going Services"), including Release of three (3) subcutaneous cGMP Batches manufactured in 2022 under the 1K DMSA (collectively, the "SC Batches"), in each case, pursuant to the terms of the applicable MSA (as if such MSA was not terminated solely with respect to such On-Going Services until completion of such On-Going Services).

2.3 All Parties shall take such steps concerning termination as are required by each of the MSAs.

2.4 Other than terms related to fees, expenses, and costs (including Cancellation Fees) and the payment of any of foregoing (which terms are fully superseded by this Termination Agreement)

the terms of each MSA that are to survive termination as per the terms of each applicable MSA shall survive termination of such MSA.

3. Payment

3.1 In exchange for termination of the MSAs, the releases, and the other agreements herein, as well as in full payments for: (i) all amounts paid or payable under the MSAs (including amounts that would be invoiced and/or otherwise payable after the Effective Date), including amounts for all Raw Materials (including the Allakos Raw Materials) and all Raw Materials Fees, Cell Bank Storage fees, and amounts due with respect to any subcontractor and/or external laboratories, and (ii) performance and completion of the On-Going Services, Allakos will pay Lonza an aggregate amount of one hundred and twenty-six million Swiss Francs (CHF126,000,000) (the "Termination Amount").

3.2 Allakos will pay Lonza ninety-five percent (95%) of the Termination Amount within thirty (30) days after the Effective Date.

3.3 Allakos will pay Lonza the remaining five percent (5%) of the Termination Amount within thirty (30) days after Release of the last of the SC Batches.

3.4 All such payments of the Termination Amount will be payable by way of bank transfer as follows:

(a) **To Lonza AG**: fifty point nine percent (50.9%) of the Termination Amount to the following account:

Credit Suisse AG, PO Box, CH-8071, Zurich, Switzerland	
BIC (Swift)	[***]
IBAN	[***]
Account	[***]

(b) **To Lonza Sales AG**: forty-nine point one percent (49.1%) of the Termination Amount to the following account:

Credit Suisse AG, PO Box, CH-8071, Zurich, Switzerland	
BIC (Swift)	[***]
IBAN	[***]
Account	[***]

3.5 Interest shall accrue and be payable by Allakos on any part of the Termination Amount that is not paid in accordance with clause 3.2 or 3.3, as applicable, at the rate of 2% per annum above the Swiss Average Rate Overnight (SARON).

3.6 Notwithstanding clause 3.2 in the event Allakos shall fail to pay the first ninety-five percent (95%) of the Termination Amount within thirty (30) days following the Effective Date, Lonza may at its option give notice to Allakos that this Termination Agreement is terminated, null and void.

3.7 Lonza's agreement to the terms and conditions of this Termination Agreement is expressly predicated and conditioned upon the Termination Amount being a final and indefeasible payment. In the event Lonza is required to return any portion of the Termination Amount for any reason, including without limitation a "clawback" action brought by or on behalf of a bankruptcy estate, Lonza shall be entitled to assert the full amount of the Aggregate Cancellation Amount (offset only by the portion of the Termination Amount, if any, that Lonza retains), and may assert the Aggregate Cancellation Amount as a counterclaim or right of offset in any such action.

4. **Raw Materials.**

As of the Effective Date, Lonza holds and/or has placed orders for Raw Materials purchased for use with Services that were to be provided to Allakos (collectively, the "Allakos Raw Materials"). For clarity, Lonza will not seek separate payment for the amount owed by Allakos for such Allakos Raw Materials (including any Raw Materials Fees), since the Parties have agreed that the Termination Amount as defined in clause 3.1 includes the Parties' negotiated settlement on all matters under the MSAs. Upon payment of the amount in clause 3.2 (95% of the Termination Amount), title to and risk of loss of the Allakos Raw Materials shall transfer to Allakos (and/or, if Lonza has not yet received title to any such Allakos Raw Material as of such payment, title to such Allakos Raw Material will automatically transfer to Allakos immediately after Lonza takes title thereto). Following the Effective Date, Allakos and Lonza shall cooperate in good faith to make an orderly disposition of the Allakos Raw Materials as agreed by Allakos and Lonza, recognising that (a) the Allakos Raw Materials includes Raw Materials unique to Allakos that Lonza cannot repurpose or sell to other Lonza customers and (b) Lonza cannot re-sell or re-allocate certain other Allakos Raw Materials to Lonza's other customers since Lonza has already separately purchased the required raw materials for those other customers' campaigns.

5. Release

5.1 Subject to clause 3.7, this Termination Agreement is in full and final settlement of, and each party, on behalf of itself and its Related Parties, hereby releases and forever discharges, each other party and each other party's Related Parties from all and/or any actions, claims, rights, demands, liabilities, damages, losses, covenants, obligations, agreements, promises, complaints, suits, causes of action, costs, expenses, debts, and set-offs of any kind and/or nature, including without limitation claims for penalties, general damages, direct and indirect, incidental and consequential damages, exemplary, punitive, compensatory and special damages, equitable relief, and

attorneys' fees, in any jurisdiction worldwide, whether accrued or unaccrued, suspected or unsuspected, asserted or unasserted, foreseen or unforeseen, fixed or contingent, liquidated or unliquidated (collectively, Claims), that it and/or its Related Parties ever had, may have, and/or hereafter can, shall, and/or may have against the other party and/or any of its Related Parties arising out of and/or connected with, subject to clauses 2.4 and 5.2 hereof, the MSAs and the subject matters(s) thereof (collectively the **Released Claims**), provided, however, that the release by Lonza and its Related Parties of Allakos and its Related Parties shall be effective only upon the passage of 96 days from the date of completion of payment in full of the Termination Amount without Allakos having commenced or become the subject of a bankruptcy case (e.g., a case under title 11 of the United States Code) before the expiration of such period.

5.2 No Release of Payments Due Under this Termination Agreement or for On-Going Services: The Parties hereby expressly acknowledge that they are not, by this Termination Agreement, releasing any claims that arise under the terms of this Termination Agreement or Lonza's performance of (or failure to perform) the On-Going Services, and/or the breach of such terms or performance obligations (including, but not limited to, any failure by Allakos and/or Lonza to make any of the payments due hereunder).

5.3 Each party affirms that it has not filed with any governmental agency and/or court any type of action and/or report against any other party, and currently knows of no existing act and/or omission by the other party that may constitute a claim and/or liability excluded from the release in Clause 5.1.

6. Agreement not to sue

6.1 Each party agrees, on behalf of itself and on behalf of its Related Parties, not to sue, commence, voluntarily aid in any way, prosecute and/or cause to be commenced and/or prosecuted against the other party and/or its Related Parties any action, suit and/or other proceeding concerning the Released Claims, in this jurisdiction and/or any other.

6.2 Clause 5 and clause 6.1 shall not apply to, and the Released Claims shall not include, any claims in respect of any breach of this Termination Agreement or Lonza's performance of (or failure to perform) the On-Going Services.

7. Costs and Taxes

7.1 The parties shall each bear their own legal costs in relation to the negotiation and documentation of this Termination Agreement.

7.2 Each party shall be solely responsible for, and is legally bound to make payment of, any taxes determined to be due and owing (including penalties and interest related thereto) by it to any national, federal, state, local, and/or regional taxing authority as a result of its receipt of any payment hereunder. Each party agrees to indemnify and hold the paying party harmless in the

event that any governmental taxing authority asserts against the paying party any claim for unpaid taxes, failure to withhold taxes, penalties, and/or interest based upon the payment of any amount hereto to such recipient party.

7.3 This clause 7 supersedes and overrides any and all previous agreements between the parties in relation to this Termination Agreement (including the implementation of all matters provided by this Termination Agreement).

8. Warranties and authority

8.1 Each party warrants and represents that it has not sold, transferred, assigned, and/or otherwise disposed of its interest in the Released Claims.

8.2 Each party warrants and represents to the other with respect to itself that it has the full right, power, and authority to execute, deliver, and perform this Termination Agreement.

8.3 Each party warrants and represents that it has received independent legal advice with respect to the advisability of executing this Termination Agreement. The Parties further acknowledge they have been fully advised by their attorneys with respect to their rights and obligations under this Termination Agreement and understand those rights and obligations. The Parties also acknowledge that, before execution of this Termination Agreement, they and/or their legal counsel have had an adequate opportunity to make any investigation and/or inquiries deemed necessary and/or desirable with respect to the subject matter of this Termination Agreement.

8.4 Except as set forth above, each of the Parties represents, warrants, and agrees that in executing this Termination Agreement it has relied solely on the statements expressly set forth herein. Each of the Parties further represents, warrants, and agrees that in executing this Termination Agreement it has placed no reliance whatsoever on any statement, representation, and/or promise of any other Party, and/or any other person or entity, not expressly set forth herein, and/or upon the failure of any other Party and/or any other person and/or entity to make any statement, representation or disclosure of anything whatsoever.

9. Indemnities

Each party hereby indemnifies and holds harmless, and shall keep indemnified and held harmless, the other party against all Claims in respect of any of the Released Claims which it and/or its Related Parties and/or any of them may bring against the other party and/or its Related Parties or any of them.

10. No admission

This Termination Agreement is entered into in connection with the compromise of matters between and/or among the parties and in the light of other considerations. It is not, and shall not

be represented and/or construed by the parties as, an admission of liability and/or wrongdoing on the part of either party to this Termination Agreement and/or any other person or entity.

11. Severability

If any provision and/or part-provision of this Termination Agreement is or becomes invalid, illegal, and/or unenforceable, it shall be deemed modified to the minimum extent necessary to make it valid, legal, and enforceable. If such modification is not possible, the relevant provision and/or part-provision shall be deemed deleted, provided, however, that in the event that the terms and conditions of this Termination Agreement are materially altered, the parties will, in good faith, renegotiate the terms and conditions of this Termination Agreement to reasonably replace such invalid and/or unenforceable provisions in light of the intent of this Termination Agreement. Any modification to and/or deletion of a provision and/or part-provision under this clause shall not affect the validity and enforceability of the rest of this Termination Agreement.

12. Entire Agreement / Construction

12.1 Subject to clause 12.3, this Termination Agreement constitutes the entire agreement between the parties and supersedes and extinguishes all previous agreements, promises, assurances, warranties, representations, and understandings between them, whether written or oral, relating to its subject matter.

12.2 Each party agrees that it shall have no remedies in respect of any statement, representation, assurance, and/or warranty (whether made innocently or negligently) that is not set out in this Termination Agreement. Each party agrees that it shall have no claim for innocent and/or negligent misrepresentation based on any statement in this Termination Agreement.

12.3 For clarity, this Termination Agreement does not terminate, amend, and/or modify any agreement between and/or among any of parties other than the MSAs, including, without limitation, the Non-Exclusive License Agreement, dated 31Oct2013, among Allakos, Lonza Sales AG, and the other party thereto, and the Siglec-8 GS Cell Line Agreement, dated 8Oct2018, among Allakos and Lonza Sales AG.

12.4 Neither this Termination Agreement, nor any provision herein, shall be deemed to have been prepared or drafted by any particular party or construed against any party on the ground that such party drafted this Termination Agreement or any provision thereof. The term “including” as used in this Termination Agreement is used to list items by way of example and shall not be deemed to constitute a limitation of any term or provision contained herein. Further, the parties also acknowledge that the terms and conditions set forth in this Termination Agreement are fair, adequate, reasonable, and proper, and that this Termination Agreement is the result of arms-length negotiations between the parties.

13. Confidentiality

The terms of this Termination Agreement, and the substance of all negotiations in connection with it, are confidential to the parties and their advisers, who shall not disclose them to, and/or otherwise communicate them to, any third party without the written consent of the other party other than:

(a) to the parties' respective auditors, insurers, and lawyers on terms which preserve confidentiality; and

(b) pursuant to an order of a court of competent jurisdiction, and/or pursuant to any proper order and/or demand made by any competent authority and/or body where they are under a legal and/or regulatory obligation to make such a disclosure; and

(c) pursuant to any express requirement under the rules of any listing authority and/or stock exchange on which a party's shares and/or those of any of its Group Companies are subject; and

(d) as far as necessary to implement and enforce any of the terms of this Termination Agreement.

For the avoidance of doubt, nothing in this 913 prevents the parties from making a disclosure to a regulator regarding any alleged misconduct, wrongdoing, and/or serious breach of regulatory requirements, and/or making a disclosure to any law enforcement agency regarding an alleged criminal offence and/or co-operating with any law enforcement agency regarding a criminal investigation and/or prosecution.

14. Governing law

This Termination Agreement and any dispute and/or claim (including non-contractual disputes and/or claims) arising out of and/or in connection with it and/or its subject matter and/or formation shall be governed by and construed in accordance with the internal laws of the State of New York, without regard to its choice of law provisions.

15. Jurisdiction

Each party irrevocably agrees that the courts of the State of New York shall have non-exclusive jurisdiction to settle any dispute and/or claim (including non-contractual disputes and/or claims) arising out of and/or in connection with this Termination Agreement and/or its subject matter and/or formation.

16. Contracts (Rights of Third Parties) Act 1999; No Third-Party Beneficiaries

The parties agree that the terms of this Termination Agreement are not enforceable by any third party under the Contracts (Rights of Third Parties) Act 1999, and that no third party is an intended beneficiaries of this Termination Agreement.

17. Co-operation

The parties shall deliver and/or cause to be delivered such instruments and other documents at such times and places as are reasonably necessary and/or desirable, and shall take any other action reasonably requested by the other party for the purpose of putting this Termination Agreement into effect.

18. Counterparts

18.1 This Termination Agreement may be executed in any number of counterparts, each of which shall constitute a duplicate original, but all the counterparts shall together constitute the one agreement. For the purposes of completion, signatures by the parties' legal advisers shall be binding.

18.2 Transmission of an executed counterpart of this Termination Agreement (but for the avoidance of doubt not just a signature page) by email in PDF and/or other agreed format) shall take effect as the transmission of an executed "wet ink" counterpart of this Termination Agreement.

18.3 No counterpart shall be effective until each party has provided to the others at least one executed counterpart.

19. Variation

No variation of this Termination Agreement shall be effective unless it is in writing and signed by the parties (and/or their authorised representatives).

This Termination Agreement has been entered into on the date stated at the beginning of it.

IN WITNESS WHEREOF, each of the Parties hereto has caused this Termination Agreement to be executed by its duly authorized representative effective as of the date written above.

LONZA AG

By: /s/ Daniel Blaettler
Name: Daniel Blaettler
Title: General Counsel Corporate

By: /s/ Michael Stanek
Name: Michael Stanek
Title: General Counsel, EMEA

LONZA SALES AG

By: /s/ Daniel Blaettler
Name: Daniel Blaettler
Title: General Counsel Corporate

By: /s/ Jennifer Cannon
Name: Jennifer Cannon
Title: Head of Mammalian

ALLAKOS INC.

By: /s/ Robert Alexander
Name: Robert Alexander
Title: Chief Executive Officer

ALLAKOS INC.

By: /s/ Adam Tomasi
Name: Adam Tomasi
Title: President and Chief Operating Officer

Initials by ALLAKOS INC:

M.A._____ B.R._____

Legal Finance

Exhibit A

On-Going Services

- Three (3) SC Batches: Manufacture and Release of Three (3) subcutaneous cGMP Batches manufactured in 2022 under the 1K DMSA

- Other Identified On-Going Services:

Services	Stage #	SOW #	Agreement
Completion of timepoints testing of ongoing SC DS and DP Stability Studies	92, 105, 106, 118, 156, 161, 168	64, 67 and 100 71, 78, 88 and 98, 93, 101	1K DMSA
Completion of HCP testing at Lonza for Clinical/PPQ runs at Fujifilm	434	7	1K CSA
Execute Siglec-8 Assay Agreement to transfer cell banks for Eurofins testing	No signed stage at the moment. Stage 170 has now been assigned in the tracker as reference	TBC	TBC
Completion of Potelligent Cell line creation for Allakos to generate process-specific HCP reagent	335	87	BLA Agreement

Completion of Lonza activities needed to support DS and DP stability testing such as stability of primary reference, requalification of assay reference, and annual verification of potency assays	60, 75, 253, 320, 331, 334, 261	Initial contract, 98, 53 and 85, 74, 86, 86, 35, 49, 63, 70	BLA Agreement and 1K DMSA
Finalize and transmit study reports from completed MSS and Poros Chromatography Cleaning Verification Study at Manufacturing Scale (“Blank Run”) - Post PPQ testing	293, 294	54	BLA Agreement
Finalize and transmit study reports from completed MSS and POROS XS Chromatography Resins Lifetime Studies at Manufacturing Scale-Post PPQ batch testing	291, 292	54,	BLA Agreement
Lonza to ship MCB/WCB, DS/in process samples from Slough/Visp to Allakos designated sites	N/A	N/A	

- Replacement Batches: For any above described On-Going Service that includes the manufacture of a cGMP Batch, the applicable On-Going Service includes, for clarity, Release and acceptance of such Batches and, if requested by Allakos, provision of a replacement Batch by Lonza for any rejected Batches if and as set forth the applicable MSA (such as if the Failed Batch was a Lonza Responsibility). If, for any such failed cGMP Batch, Lonza is not required to provide a replacement Batch pursuant to the terms of the applicable MSA (such as for a failed Batch not caused by a Lonza Responsibility), then, upon Allakos’s request, Lonza shall negotiate in good faith with Allakos for the provisions of a replacement cGMP Batch upon commercially reasonable terms. For any such replacement Batch, if possible, Lonza shall use manufacturing slots for Services that would have otherwise have been used for Allakos’s Product but for termination of the MSA pursuant to this Termination Agreement.

- BLA Support: Lonza shall provide Allakos with reasonably requested data, information, documentation, and support in connection with Allakos's seeking and/or obtaining Approval(s) (including BLA(s)) for the Products, provided that the obligation to provide such support (other than to deliver then-existing data, information, and documentation) will continue only for a period of twelve (12) months after the Effective Date.

- Winddown Generally: In addition to the above Services, for a period of twelve (12) months after the Effective Date, Lonza shall provide Allakos with reasonable assistance in winding down currently in-process Services, which may include, without limitation, transferring relevant data and information related to completed Services and On-Going Services to Allakos and/or relevant Regulatory Authorities and/or other Governmental Authorities.

Exhibit 10.21

NOTICE OF TERMINATION

February 24, 2022

From: Allakos, Inc.
975 Island Drive, Suite 201
Redwood City, California 94065

To: Cowen and Company, LLC
599 Lexington Avenue
New York, New York 10022
Attention: General Counsel

Attention: Bradley Friedman, General Counsel

Re: Notice of Termination of Sales Agreement, dated as of May 10, 2021

Ladies and Gentlemen,

Reference is made to that certain Sales Agreement, dated as of May 10, 2021 (the "Sales Agreement"), by and among Allakos, Inc. (the "Company") and Cowen and Company, LLC ("Cowen"). Capitalized terms used but not defined herein shall have the meanings ascribed to such terms in the Sales Agreement.

Pursuant to Section 11(c) of the Sales Agreement, the Company hereby provides written notice (this "Notice") of termination of the Sales Agreement, with such termination to be effective as of the date first written above (the "Termination Date"). As of the Termination Date, all rights and obligations of the Company and Cowen under the Sales Agreement shall terminate with the exception of those provisions or terms which by their terms survive the termination of the Sales Agreement.

Notwithstanding anything to the contrary contained therein, Cowen hereby expressly agrees to waive the ten (10) days' notice requirement set forth in Section 11(c) of the Sales Agreement.

Except as specifically provided herein, nothing in this Notice is intended to, nor shall it, modify the Sales Agreement in any manner.

This Notice and any claim, controversy or dispute arising under or related to this Notice shall be governed by and construed in accordance with the laws of the State of New York.

This Notice may be signed in one or more counterparts, each of which shall constitute an original and all of which together shall constitute one and the same agreement. Delivery of an executed counterpart of a signature page to this letter agreement by facsimile or other electronic

transmission shall be effective as delivery of a manually signed counterpart. The words “execution,” “signed,” “signature,” “delivery,” and words of like import in or relating to this Notice hereby shall be deemed to include Electronic Signatures (as defined below), deliveries or the keeping of records in electronic form, each of which shall be of the same legal effect, validity or enforceability as a manually executed signature, physical delivery thereof or the use of a paper-based recordkeeping system, as the case may be. “Electronic Signatures” means any electronic symbol or process attached to, or associated with, any contract or other record and adopted by a person with the intent to sign, authenticate or accept such contract or record.

[*Signature Pages Follow*]

Very truly yours,

Allakos, Inc.

By: /s/ Mark Asbury
Name: Mark Asbury
Title: Chief Legal Officer, General Counsel and Secretary

[*Signature Page (Termination Notice to Sales Agreement)*]

Agreed and Accepted:

Cowen and Company, LLC

By: /s/ Michael Murphy
Name: Michael Murphy
Title: Managing Director

Exhibit 23.1

Consent of Independent Registered Public Accounting Firm

We consent to the incorporation by reference in the Registration Statements:

(1) Registration Statements (Form S-8 No. 333-226247, 333-231276, 333-236631, 333-253701, 333-262749) pertaining to the 2018 Equity Incentive Plan, the 2018 Employee Stock Purchase Plan and the amended 2012 Equity Incentive Plan of Allakos Inc., and

(2) Registration Statement (Form S-3 No. 333-233018) of Allakos Inc.,

of our reports dated March 1, 2022, with respect to the financial statements of Allakos Inc. and the effectiveness of internal control over financial reporting of Allakos Inc., included in this Annual Report (Form 10-K) for the year ended December 31, 2021.

/s/ Ernst & Young LLP

Redwood City, California
March 1, 2022

Exhibit 31.1

CERTIFICATION PURSUANT TO
RULES 13a-14(a) AND 15d-14(a) UNDER THE SECURITIES EXCHANGE ACT OF 1934,
AS ADOPTED PURSUANT TO SECTION 302 OF THE SARBANES-OXLEY ACT OF 2002

I, Robert Alexander, certify that:

1. I have reviewed this Annual Report on Form 10-K of Allakos Inc.;

2. Based on my knowledge, this report does not contain any untrue statement of a material fact or omit to state a material fact necessary to make the statements made, in light of the circumstances under which such statements were made, not misleading with respect to the period covered by this report;

3. Based on my knowledge, the financial statements, and other financial information included in this report, fairly present in all material respects the financial condition, results of operations and cash flows of the registrant as of, and for, the periods presented in this report;

4. The registrant's other certifying officer and I are responsible for establishing and maintaining disclosure controls and procedures (as defined in Exchange Act Rules 13a-15(e) and 15d-15(e)) and internal control over financial reporting (as defined in Exchange Act Rules 13a-15(f) and 15d-15(f)) for the registrant and have:

   (a) Designed such disclosure controls and procedures, or caused such disclosure controls and procedures to be designed under our supervision, to ensure that material information relating to the registrant, including its consolidated subsidiaries, is made known to us by others within those entities, particularly during the period in which this report is being prepared;

   (b) Designed such internal control over financial reporting, or caused such internal control over financial reporting to be designed under our supervision, to provide reasonable assurance regarding the reliability of financial reporting and the preparation of financial statements for external purposes in accordance with generally accepted accounting principles;

   (c) Evaluated the effectiveness of the registrant's disclosure controls and procedures and presented in this report our conclusions about the effectiveness of the disclosure controls and procedures, as of the end of the period covered by this report based on such evaluation; and

   (d) Disclosed in this report any change in the registrant's internal control over financial reporting that occurred during the registrant's most recent fiscal quarter (the registrant's fourth fiscal quarter in the case of an annual report) that has materially affected, or is reasonably likely to materially affect, the registrant's internal control over financial reporting; and

5. The registrant's other certifying officer and I have disclosed, based on our most recent evaluation of internal control over financial reporting, to the registrant's auditors and the audit committee of the registrant's board of directors (or persons performing the equivalent functions):

   (a) All significant deficiencies and material weaknesses in the design or operation of internal control over financial reporting which are reasonably likely to adversely affect the registrant's ability to record, process, summarize and report financial information; and

   (b) Any fraud, whether or not material, that involves management or other employees who have a significant role in the registrant's internal control over financial reporting.

Date: March 1, 2022

By: /s/ Robert Alexander
Robert Alexander
President and Chief Executive Officer
(Principal Executive Officer)

Exhibit 31.2

CERTIFICATION PURSUANT TO
RULES 13a-14(a) AND 15d-14(a) UNDER THE SECURITIES EXCHANGE ACT OF 1934,
AS ADOPTED PURSUANT TO SECTION 302 OF THE SARBANES-OXLEY ACT OF 2002

I, H. Baird Radford, III, certify that:

1. I have reviewed this Annual Report on Form 10-K of Allakos Inc.;

2. Based on my knowledge, this report does not contain any untrue statement of a material fact or omit to state a material fact necessary to make the statements made, in light of the circumstances under which such statements were made, not misleading with respect to the period covered by this report;

3. Based on my knowledge, the financial statements, and other financial information included in this report, fairly present in all material respects the financial condition, results of operations and cash flows of the registrant as of, and for, the periods presented in this report;

4. The registrant's other certifying officer and I are responsible for establishing and maintaining disclosure controls and procedures (as defined in Exchange Act Rules 13a-15(e) and 15d-15(e)) and internal control over financial reporting (as defined in Exchange Act Rules 13a-15(f) and 15d-15(f)) for the registrant and have:

   (a) Designed such disclosure controls and procedures, or caused such disclosure controls and procedures to be designed under our supervision, to ensure that material information relating to the registrant, including its consolidated subsidiaries, is made known to us by others within those entities, particularly during the period in which this report is being prepared;

   (b) Designed such internal control over financial reporting, or caused such internal control over financial reporting to be designed under our supervision, to provide reasonable assurance regarding the reliability of financial reporting and the preparation of financial statements for external purposes in accordance with generally accepted accounting principles;

   (c) Evaluated the effectiveness of the registrant's disclosure controls and procedures and presented in this report our conclusions about the effectiveness of the disclosure controls and procedures, as of the end of the period covered by this report based on such evaluation; and

   (d) Disclosed in this report any change in the registrant's internal control over financial reporting that occurred during the registrant's most recent fiscal quarter (the registrant's fourth fiscal quarter in the case of an annual report) that has materially affected, or is reasonably likely to materially affect, the registrant's internal control over financial reporting; and

5. The registrant's other certifying officer and I have disclosed, based on our most recent evaluation of internal control over financial reporting, to the registrant's auditors and the audit committee of the registrant's board of directors (or persons performing the equivalent functions):

   (a) All significant deficiencies and material weaknesses in the design or operation of internal control over financial reporting which are reasonably likely to adversely affect the registrant's ability to record, process, summarize and report financial information; and

   (b) Any fraud, whether or not material, that involves management or other employees who have a significant role in the registrant's internal control over financial reporting.

Date: March 1, 2022

By: /s/ H. Baird Radford, III
H. Baird Radford, III
Chief Financial Officer
(Principal Financial and Accounting Officer)

Exhibit 32.1

CERTIFICATION OF PRINCIPAL EXECUTIVE OFFICER PURSUANT TO 18 U.S.C. SECTION 1350, AS ADOPTED PURSUANT TO SECTION 906 OF THE SARBANES-OXLEY ACT OF 2002

In connection with the Annual Report of Allakos Inc. (the "Company") on Form 10-K for the year ended December 31, 2021 as filed with the Securities and Exchange Commission on the date hereof (the "Report"), I hereby certify, pursuant to 18 U.S.C. Section 1350, as adopted pursuant to Section 906 of the Sarbanes-Oxley Act of 2002, that:

(1) The Report fully complies with the requirements of section 13(a) or 15(d) of the Securities Exchange Act of 1934; and

(2) The information contained in the Report fairly presents, in all material respects, the financial condition and results of operations of the Company.

Date: March 1, 2022

By: /s/ Robert Alexander
Robert Alexander
President and Chief Executive Officer
(Principal Executive Officer)

Exhibit 32.2

CERTIFICATION OF PRINCIPAL FINANCIAL OFFICER PURSUANT TO
18 U.S.C. SECTION 1350, AS ADOPTED PURSUANT TO
SECTION 906 OF THE SARBANES-OXLEY ACT OF 2002

In connection with the Annual Report of Allakos Inc. (the "Company") on Form 10-K for the year ended December 31, 2021 as filed with the Securities and Exchange Commission on the date hereof (the "Report"), I hereby certify, pursuant to 18 U.S.C. Section 1350, as adopted pursuant to Section 906 of the Sarbanes-Oxley Act of 2002, that:

(1) The Report fully complies with the requirements of section 13(a) or 15(d) of the Securities Exchange Act of 1934; and

(2) The information contained in the Report fairly presents, in all material respects, the financial condition and results of operations of the Company.

Date: March 1, 2022

By: /s/ H. Baird Radford, III
H. Baird Radford, III
Chief Financial Officer
(Principal Financial and Accounting Officer)