# 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 , 2023**

**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: 001-37378**

# ATYR PHARMA, INC.

**(Exact name of registrant as specified in its charter)**

| **Delaware** | **20-3435077** |
|---|---|
| **(State or other jurisdiction of incorporation or organization)** | **(I.R.S. Employer Identification No.)** |
| **10240 Sorrento Valley Road , Suite 300 , San Diego , CA** | **92121** |
| **(Address of principal executive offices)** | **(Zip Code)** |

**Registrant's telephone number, including area code: ( 858 ) 731-8389**

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

| **Title of each class** | **Trading Symbol** | **Name of each exchange on which registered** |
|---|---|---|
| **Common Stock, par value $0.001 per share** | **LIFE** | **The Nasdaq Capital 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 Section 15(d) of the Act. Yes ☐ No ☐

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

Indicate by check mark whether the registrant has submitted electronically every Interactive Data File required to be submitted pursuant to Rule 405 of Regulation S-T (§232.405 of this chapter) during the preceding 12 months (or for such shorter period that the registrant was required to submit such files).

☐ Yes ☐ No

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

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

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

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

If securities are registered pursuant to Section 12(b) of the Act, indicate by check mark whether the financial statements of the registrant included in the filing reflect the correction of an error to previously issued financial statements. ☐

Indicate by check mark whether any of those error corrections are restatements that required a recovery analysis of incentive-based compensation received by any of the registrant's executive officers during the relevant recovery period pursuant to §240.10D-1(b). ☐

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

The aggregate market value of the registrant's voting and non-voting common equity held by non-affiliates of the registrant was approximately $

120,774,416

based on the closing price of the registrant's common stock on the Nasdaq Capital Market of $2.16 per share on June 30, 2023, the last business day of the registrant's most recently completed second fiscal quarter. Shares of common stock held by each executive officer and director have been excluded from this calculation. This determination of affiliate status may not be conclusive for other purposes.

The number of outstanding shares of the registrant's common stock, par value $0.001 per share, as of March 13, 2024 was

67,750,024

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**DOCUMENTS INCORPORATED BY REFERENCE**

Portions of the registrant's definitive proxy statement to be filed with the Securities and Exchange Commission (SEC), pursuant to Regulation 14A in connection with the registrant's 2024 Annual Meeting of Stockholders, which will be filed subsequent to the date hereof, are incorporated by reference into Part III of this Annual Report on Form 10-K. Such proxy statement will be filed with the SEC not later than 120 days following the end of the registrant's fiscal year ended December 31, 2023 .

**ATYR PHARMA, INC.**

**ANNUAL REPORT ON FORM 10-K**

**For the Fiscal Year Ended December 31, 2023**

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*In this Annual Report on Form 10-K (Annual Report), unless the context requires otherwise, "aTyr Pharma," "aTyr," "Company," "we," "our," and "us" means aTyr Pharma, Inc. and our subsidiary, Pangu BioPharma Limited.*

The market data and certain other statistical information used in this Annual Report are based on independent industry publications, governmental publications, reports by market research firms or other independent sources. Some data are also based on our good faith estimates. Information that is based on estimates, forecasts, projections, market research or similar methodologies is inherently subject to uncertainties and actual events or circumstances may differ materially from events and circumstances reflected in this information.

We own various U.S. federal trademark applications and unregistered trademarks, including our company name. All other trademarks or trade names referred to in this Annual Report are the property of their respective owners. Solely for convenience, the trademarks and trade names in this Annual Report are referred to without the symbols ® and ™, but such references should not be construed as any indicator that their respective owners will not assert, to the fullest extent under applicable law, their rights thereto.

**Forward-Looking Statements**

In addition to historical information, this Annual Report and the information incorporated herein by reference contains forward-looking statements within the meaning of Section 27A of the Securities Act of 1933, as amended (Securities Act) and Section 21E of the Securities Exchange Act of 1934, as amended (Exchange Act) including statements regarding our business, our financial position, the research and development of biopharmaceutical products, the timing of clinical trial activities and other statements describing our goals, expectations, intentions or beliefs. These statements include but are not limited to statements under the captions "Business" and "Management's Discussion and Analysis of Financial Condition and Results of Operations", as well as other sections in this Annual Report. Such statements reflect our current views and assumptions and are subject to risks and uncertainties, particularly those inherent in the process of developing and commercializing biopharmaceutical products. Actual results could differ materially from those discussed in this Annual Report. Factors that could cause or contribute to such differences include, but are not limited to, those identified in Part I, Item 1A "Risk Factors", as well as those discussed in our other filings with the Securities and Exchange Commission (SEC). As a result, you are cautioned not to unduly rely on these forward-looking statements. We disclaim any duty to update any forward-looking statement to reflect events or circumstances that occur after the date on which such statement is made, except at required by law.

**Risk Factors Summary**

*Below is a summary of the principal factors that make an investment in our securities speculative or risky. This summary does not address all of the risks that we face. Additional discussion of the risks summarized in this risk factors summary, and other risks that we face, can be found in Part I, Item 1A "Risk Factors" and should be carefully considered, together with other information in this Annual Report and our other filings with the SEC before making investment decisions regarding our securities.*

Investing in our securities involves substantial risk. The risks described under Part I, Item 1A "Risk Factors" of this Annual Report may cause us to not realize the full benefits of our strengths or may cause us to be unable to successfully execute all or part of our strategy. Some of the more significant risks we face include the following:

- We may encounter substantial delays and other challenges in our ongoing or planned clinical trials or we may fail to demonstrate safety and efficacy to the satisfaction of applicable regulatory authorities;
- If we are unable to successfully complete or otherwise advance clinical development, obtain regulatory or marketing approval for, or successfully commercialize our therapeutic product candidates, including efzofitimod, or experience significant delays in doing so, our business will be materially harmed;
- There is no established FDA regulatory pathway for approval of a drug in pulmonary sarcoidosis. As a result, our Phase 3 randomized, double-blind, placebo-controlled clinical trial to evaluate the efficacy and safety of efzofitimod in patients with pulmonary sarcoidosis (the EFZO-FIT study), even if successful, may not be sufficient to support FDA approval, which would materially and adversely harm our business;
- Our current product candidates and any other product candidates that we may develop from our discovery platform represent novel therapeutic approaches, which may cause significant delays or may not result in any commercially viable drugs;
- Our therapeutic product candidates may cause undesirable side effects or have other properties that could delay or prevent their regulatory approval, limit the commercial profile of an approved label, or result in significant negative consequences following marketing approval, if any;
- We will need to raise additional capital or enter into strategic partnering relationships to fund our operations;

• We are a pre-commercial biotherapeutics company and have incurred significant losses since our inception and anticipate that we will continue to incur significant losses for the foreseeable future;

• We depend on our existing collaborations and may depend on collaborations with additional third parties for the development and commercialization of certain of our product candidates. If our collaborations are not successful, we may not be able to capitalize on the market potential of these product candidates;

• If we are unable to obtain, maintain or protect intellectual property rights related to our product candidates, or if the scope of such intellectual property protection is not sufficiently broad, we may not be able to compete effectively in our markets;

• Our future success depends on our ability to retain key employees, consultants and advisors and to attract, retain and motivate qualified personnel;

• Unfavorable macroeconomic conditions could adversely affect our business, financial condition or results of operations; and

• The market price of our common stock historically has been highly volatile and is likely to continue to be volatile, and you could lose all or part of your investment.

## PART I

### Item 1. Business.

We are a clinical stage biotechnology company leveraging evolutionary intelligence to translate tRNA synthetase biology into new therapies for fibrosis and inflammation. tRNA synthetases are ancient, essential proteins that have evolved novel domains that regulate diverse pathways extracellularly in humans. Our discovery platform is focused on unlocking hidden therapeutic intervention points by uncovering signaling pathways driven by our proprietary library of domains derived from all 20 tRNA synthetases.

*Efzofitimod*

Our lead therapeutic candidate is efzofitimod, a first-in-class biologic immunomodulator in clinical development for the treatment of interstitial lung disease (ILD), a group of immune-mediated disorders that can cause inflammation and fibrosis, or scarring, of the lungs. Efzofitimod is a tRNA synthetase derived therapy that selectively modulates activated myeloid cells through neuropilin-2 (NRP2) to resolve aberrant inflammation without immune suppression and potentially prevent the progression of fibrosis. ILDs are predominantly immune-mediated disorders that are characterized by chronic inflammation, which can lead to progressive fibrosis of the lung. There are limited treatment options for ILD and there remains a high unmet medical need. Sarcoidosis and systemic sclerosis (SSc, also known as scleroderma)-associated ILD (SSc-ILD) are two major forms of ILD. The U.S. Food and Drug Administration (FDA) has granted efzofitimod orphan drug designations for the treatment of sarcoidosis and for the treatment of SSc, and Fast Track designations for the treatment of pulmonary sarcoidosis and for the treatment of SSc-ILD. The European Commission (EC) has granted efzofitimod orphan drug designations for the treatment of sarcoidosis and for the treatment of SSc, based on the opinion of the European Medicines Agency (EMA) Committee for Orphan Medicinal Products (COMP).

In September 2021, we announced positive results and clinical proof-of-concept from a double-blind, placebo-controlled Phase 1b/2a clinical trial in 37 patients with pulmonary sarcoidosis. The study was designed to evaluate the safety, tolerability, immunogenicity and preliminary efficacy of three doses of intravenous (IV) efzofitimod, 1.0, 3.0 and 5.0 mg/kg, in the context of a forced steroid taper. Efzofitimod was safe and well-tolerated at all doses administered with no serious drug-related adverse events or signal of immunogenicity. Additionally, the study demonstrated consistent dose response for efzofitimod on key efficacy endpoints and improvements compared to placebo, including measures of steroid reduction, lung function, pulmonary sarcoidosis symptom measures and inflammatory biomarkers. These data were subsequently presented at the American Thoracic Society (ATS) International Conference and published in the peer-reviewed journal *CHEST* during 2022.

In February 2022, we met with the FDA in an end-of-Phase 2 meeting to discuss our plans for subsequent clinical development and path to registration for efzofitimod for pulmonary sarcoidosis. Subsequently, we initiated a global pivotal Phase 3 randomized, double-blind, placebo-controlled clinical trial to evaluate the efficacy and safety of efzofitimod in patients with pulmonary sarcoidosis (the EFZO-FIT study). The EFZO-FIT study is a 52-week study consisting of three parallel cohorts randomized equally to either 3.0 mg/kg or 5.0 mg/kg of efzofitimod or placebo dosed intravenously once a month for a total of 12 doses. The study is currently enrolling and intends to enroll up to 264 subjects with pulmonary sarcoidosis at multiple centers in the United States, Europe, Brazil, and Japan. The study design incorporates a forced steroid taper. The objective of the study is to evaluate the efficacy and safety of efzofitimod in patients with pulmonary sarcoidosis. The primary endpoint of the study is steroid reduction. Secondary endpoints include measures of lung function assessed by forced vital capacity (FVC) and health-related quality of life assessments and questionnaires (KSQ lung score). In September 2022, we dosed the first patient in this study. Additionally, during 2023, we had a data and safety monitoring board

(DSMB) review of our EFZO-FIT study. The DSMB concluded that the study could continue unmodified. We expect to complete enrollment in the study in the second quarter of 2024.

In February 2024, we announced an Individual Patient Expanded Access Program (EAP). The Individual Patient EAP has been initiated based on blinded EFZO-FIT study investigator and patient participant feedback. The program is designed to allow access for patients who complete the Phase 3 EFZO-FIT study and wish to receive treatment with efzofitimod outside of the clinical trial. The administration of efzofitimod as part of the Individual Patient EAP will occur independent of the EFZO-FIT study protocol, and we, principal investigators and patients will remain blinded to the treatment that occurred as part of the EFZO-FIT study. As this Individual Patient EAP will occur independent of the EFZO-FIT study, this program is not an open-label extension (OLE) and no long-term data will be collected by us.

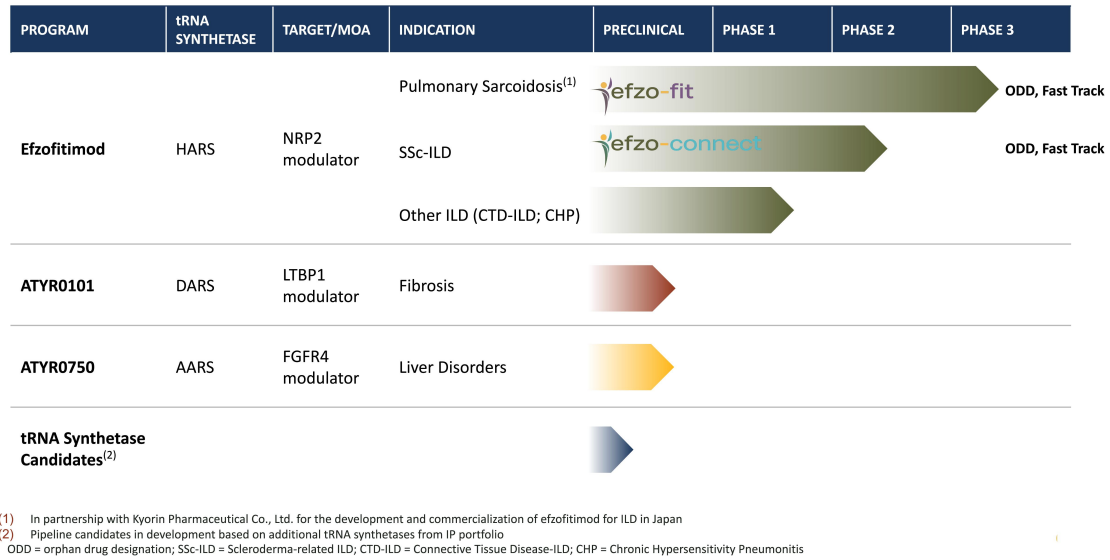
Based on the results of the Phase 1b/2a clinical trial, we believe efzofitimod has potential applications in the treatment of other ILDs, such as chronic hypersensitivity pneumonitis (CHP) and connective tissue disease related ILD (CTD-ILD), including SSc-ILD and rheumatoid arthritis-associated ILD. As such, we designed a focused Phase 2 proof-of-concept clinical trial of efzofitimod (the EFZO-CONNECT study) in patients with SSc-ILD. The EFZO-CONNECT study is a randomized, double-blind placebo-controlled proof-of-concept study to evaluate the efficacy, safety and tolerability of efzofitimod in patients with SSc-ILD. This is a 28-week study with three parallel cohorts randomized 2:2:1 to either 270 mg or 450 mg of efzofitimod or placebo dosed intravenously monthly for a total of six doses. The study intends to enroll up to 25 patients at multiple centers in the United States. The objective of the study is to evaluate the efficacy of multiple doses of IV efzofitimod on pulmonary, cutaneous and systemic manifestations in patients with SSc-ILD. The primary endpoint is reduction in FVC. Secondary endpoints include certain measures regarding safety and tolerability. The study was initiated in the third quarter of 2023, and in October 2023, we dosed the first patient in this study.

In January 2020, we entered into a collaboration and license agreement (Kyorin Agreement) with Kyorin Pharmaceutical Co., Ltd. (Kyorin) for the development and commercialization of efzofitimod for the treatment of ILD in Japan. Under the Kyorin Agreement, Kyorin received an exclusive right to develop and commercialize efzofitimod in Japan for all forms of ILD, and is obligated to fund all research, development, regulatory, marketing and commercialization activities in Japan. In 2020, Kyorin conducted and funded a Phase 1 clinical trial of efzofitimod (known as KRP-R120 in Japan). The Phase 1 clinical trial was a placebo-controlled clinical trial to evaluate the safety, pharmacokinetics (PK) and immunogenicity of efzofitimod in 32 healthy Japanese male volunteers. Efzofitimod was observed to be generally well-tolerated with no drug-related serious adverse events, and PK findings were consistent with previous studies of efzofitimod. Kyorin is also participating in the EFZO-FIT study as the local sponsor in Japan. In February 2023, Kyorin dosed the first patient in Japan in the EFZO-FIT study which triggered a $10.0 million milestone payment to us. To date, the Kyorin Agreement has generated $20.0 million in upfront and milestone payments to us and we are eligible to receive up to an additional $155.0 million in the aggregate upon achievement of certain development, regulatory and sales milestones, as well as tiered royalties on any net sales in Japan.

*Discovery Platform*

Using efzofitimod as a model, we have developed a process to advance novel tRNA synthetase domains from a concept to therapeutic candidate. This process leverages our early discovery work as well as current scientific understanding of tRNA synthetase evolution, protein structure, gene splicing and tissue-specific regulation to identify potentially active protein domains. Screening approaches are employed to identify target cells and extracellular receptors for these tRNA synthetase-derived proteins. These cellular systems can then be used in mechanism-of-action studies to elucidate the role these proteins play in cellular responses and their potential therapeutic utility. We are working to identify new tRNA synthetase based drug candidates through our internal discovery efforts and external collaboration efforts.

**Therapeutic Candidate Pipeline**




(1) In partnership with Kyorin Pharmaceutical Co., Ltd. for the development and commercialization of efzofitimod for ILD in Japan
(2) Pipeline candidates in development based on additional tRNA synthetases from IP portfolio
ODD = orphan drug designation; SSc-ILD = Scleroderma-related ILD; CTD-ILD = Connective Tissue Disease-ILD; CHP = Chronic Hypersensitivity Pneumonitis

**Strategy**

Key elements of our strategy include the following:

***Advance efzofitimod toward regulatory approval in pulmonary sarcoidosis.*** Based on the positive results and clinical proof-of-concept from our efzofitimod Phase 1b/2a clinical trial in September 2021, we believe we can expedite development of efzofitimod for pulmonary sarcoidosis toward regulatory approval. During the third quarter of 2022, we initiated the EFZO-FIT study, a global pivotal Phase 3 randomized, double-blind, placebo-controlled clinical trial to evaluate the efficacy and safety of efzofitimod in patients with pulmonary sarcoidosis. Our strategy for the advancement of efzofitimod includes completing the EFZO-FIT study which we expect will serve as the basis for regulatory approval.

***Develop efzofitimod to address unmet medical needs in other ILDs.*** In addition, we believe the positive results from our efzofitimod Phase 1b/2a clinical trial, as well as data from numerous preclinical studies we have conducted to date, will give us the opportunity to potentially launch additional Phase 2 clinical trials of efzofitimod in other forms of ILD. As part of this strategy, we initiated the EFZO-CONNECT study of efzofitimod in patients with SSc-ILD and dosed the first patient in this study in October 2023.

***Build a diverse pipeline of biologics product candidates based on our understanding of extracellular tRNA synthetase biology.*** Utilizing our unique drug discovery approach through internal research efforts and external collaboration efforts, we intend to continue to advance novel tRNA synthetase domains from concept to product candidates in the areas of fibrosis and inflammation. We have advanced two additional tRNA synthetase programs, ATYR0101 and ATYR0750, into preclinical development. We plan to further elucidate the therapeutic potential of these candidates through mechanistic investigations, including *in vitro* and *in vivo* preclinical studies.

**Efzofitimod**

*Background and Mechanism of Action*

Efzofitimod is a novel immunomodulatory Fc fusion protein in development for the treatment of ILD. Efzofitimod is a selective modulator of NRP2 that downregulates innate immune responses at a cellular level in uncontrolled inflammatory disease states to resolve chronic inflammation and prevent subsequent fibrosis.

Efzofitimod is a novel molecular entity comprised of a human 59 amino acid protein fused to the Fc region of human immunoglobulin 1 (IgG1). It acts as an extracellular immunomodulator. The amino acid sequence of the active moiety corresponds identically to the extracellularly active immunomodulatory domain of histidyl-tRNA synthetase (HARS) amino acids 2 to 60 (HARS 2-60).

The gene for HARS gives rise to a number of splice variants, and though most of these have lost their catalytic activity, they all retain the N-terminal domain (HARS amino acids 1-60). This N-terminal domain, non-essential for the enzyme's protein synthesis activity that is required in all living organisms, was appended to HARS during the evolutionary development of multicellular organisms and retained with high sequence identity across mammalian species, but is not found in lower organisms. One splice variant (SV9), which encodes only the N-terminal domain of the protein, is enriched in human lung tissue. Expression of this HARS splice variant is increased following inflammatory cytokine stimulation (interferon gamma (IFN-g) and TNF alpha (TNF-a), two key players in the initiation of lung inflammation and fibrosis) followed by subsequent secretion, indicating it is being regulated in response to local inflammation. Furthermore, HARS, specifically the N-terminal domain, is targeted by autoantibodies in a rare autoimmune disorder (known as anti-Jo-1 syndrome). Anti-Jo-1 syndrome is characterized by extensive activation and migration of immune cells into lung and muscle and is classically associated with the triad of ILD, myositis, and arthritis. It is hypothesized that the sequestration of HARS may play a causal role through disruption of its homeostatic immune-regulatory effects.

NRP2 was identified as the sole binding partner for efzofitimod through screening via a cell microarray system in which over 4,500 cell surface proteins are represented. This screening approach identified two NRP2 isoforms (Neuropilin 2A and 2B) as the only convincing and specific binding partners of efzofitimod. The binding site was confirmed to be within the "turn" of the helix-turn-helix structure of the HARS N-terminal domain comprised within efzofitimod. Binding of efzofitimod is specific to NRP2 with no observable cross-reactivity to NRP1, which is the most closely related cell surface receptor in both protein sequence and structure. A domain that is structurally similar (but divergent in protein sequence) to the HARS N-terminal domain (termed the WHEP domain) is found in other amino-acyl tRNA synthetases, yet these domains do not exhibit binding to NRP2, indicating this is a highly specific interaction. Interestingly, binding of efzofitimod occurs in a manner distinct from the more well-characterized ligands of NRP2 including VEGF and semaphorin 3F (SEMA3F), and does not interfere with NRP2 dimerization with their co-receptors. Thus, the HARS N-terminus appears to be a newly discovered ligand for NRP2, as opposed to an antagonist. The discovery of the HARS N-terminus/NRP2 signaling axis represents a previously unknown mechanism of biological regulation, in which this novel ligand of NRP2 may act as a homeostatic regulator of aberrant immune responses.

NRP2 is a cell surface receptor that is present on multiple immune cell types, including certain myeloid cells and subsets of T-cells. NRP2 expression is often upregulated upon inflammatory insult or stimulation. Growing evidence indicates that NRP2 predominantly influences myeloid cell biology such as activation and recruitment to inflammatory sites. For instance, NRP2 expression on alveolar macrophages regulates airway inflammatory responses to inhaled lipopolysaccharide. In sarcoidosis, NRP2 expression has been shown to be localized within the sarcoid granulomas, highly expressed in Langhans giant cells which are myeloid in nature.

Efzofitimod has been shown to significantly reduce lung inflammation and fibrosis, reduce immune cell trafficking to the lung and improve respiratory function parameters in multiple animal models of lung fibrosis. Furthermore, efzofitimod has demonstrated consistent downregulatory effects on inflammatory and pro-fibrotic cytokines and chemokines in both animal disease models and human clinical trials. Efzofitimod appears to primarily impact interleukin-6 (IL-6), TNF-□, IFN-□, MCP-1 and IP-10, markers that have been implicated in the pathology of ILD.

*Preclinical Development*

Our preclinical estate of translational animal models was selected to help inform and de-risk clinical development of efzofitimod. We have evaluated the biological activity and safety of efzofitimod across a diverse set of experimental fibrotic lung disease models, representative of the four major forms of ILD (sarcoidosis, CHP, CTD-ILD and idiopathic pulmonary fibrosis (IPF)), as well as in normal animals, looking for signals of activity and potential biomarkers, while confirming tolerability and a favorable safety profile.

In these models, efzofitimod has significantly reduced histological lung fibrosis and inflammation, restored normal lung function, reduced lung protein levels of several inflammation and fibrosis-related cytokines and chemokines (e.g. IFN-γ, MCP-1/CCL2, IL-6) and reduced counts of immune cells in bronchoalveolar lavage (BAL) central to ILD pathology (e.g., neutrophils). These data have been presented in posters at key respiratory conferences over the past several years (e.g. the ATS International Congress) and are available for review on our website.

Efzofitimod and NRP2 receptor

NRP2 is known to be expressed on a number of different immune cell types that play a key role in regulating inflammatory responses. Efzofitimod is a fusion protein combining a novel immunomodulatory domain from HARS and a human IgG1 Fc. Efzofitimod inhibits cytokines and chemokines involved in the regulation of inflammatory and fibrotic responses and reduces inflammation and fibrosis in animal models of ILD. Efzofitimod has previously demonstrated potent immunomodulatory activity *in vitro* and *in vivo*. We sought to characterize the molecular basis for efzofitimod's immunomodulatory properties and demonstrated that efzofitimod specifically and selectively binds to NRP2 on the cell surface. These findings indicate that modulation of the NRP2 signaling pathway with efzofitimod could be a novel therapeutic approach to immune-mediated and fibrotic diseases such as pulmonary sarcoidosis.

Sarcoidosis is characterized by the formulation of granulomas, clumps of inflammatory cells found in one or more organs of the body and denoted by the presence of Langhans giant cells which are myeloid in nature. NRP2 was shown to be expressed in samples obtained from lung and skin of sarcoidosis patients with high NRP2 expression detected on key immune cells known to play an important role in inflammation and granuloma formation, including the Langhans giant cells. In work carried out in collaboration with Dr. Elliot Crouser's laboratory at The Ohio State University utilizing an established *ex vivo* assay of granuloma formation, it was demonstrated that an efzofitimod analog containing the identical immunomodulatory HARS domain exhibited statistically significant reduction of granuloma formation generated from sarcoid peripheral blood mononuclear cells (PBMCs). Given the importance of granulomas in the pathology and progression of pulmonary sarcoidosis and the known ability of efzofitimod to disrupt inflammatory responses, we hypothesize that efzofitimod may play a role in regulating sarcoid granuloma formation. These findings highlight the potential of efzofitimod to exert its effect on various immune cells directly related to the pathology of the target patient population. These data were presented in posters at the ATS International Virtual Meeting in 2020 and the European Society International Congress in 2021. As an extension of this work, a highly selective and sensitive antibody was developed for immunohistochemical detection of the target receptor for efzofitimod, NRP2, in patient tissue samples. Development and characterization of the antibody, as well as detection of NRP2 on key immune cells in granulomas of sarcoidosis patient lung and skin biopsy samples was highlighted in a poster presentation at the European Respiratory Society (ERS) International Congress 2022 in Barcelona, Spain.

SSc-ILD is an autoimmune disease characterized by chronic inflammation and fibrosis with common involvement of the skin and lungs. As in sarcoidosis, myeloid cells are centrally involved in driving this cycle of chronic inflammation and fibrosis in SSc-ILD. One aspect of this is the production by these cells of inflammatory cytokines, including IL-6.

Based on our translational biology program, which demonstrated activity across distinct experimental animal models either driven by direct lung injury or systemic pathology, along with our understanding of efzofitimod's mechanism of action, we decided to move the program forward into patient clinical trials in ILD.

*ILD and the Role of Immunology*

The current primary target population for efzofitimod is ILD, a group of predominantly immune-mediated disorders which can cause progressive fibrosis of the lung. There are over 200 different types of ILD, of which the four major forms are: pulmonary sarcoidosis, CHP, CTD-ILD, and IPF. These four types comprise roughly 80% of the total ILD population. We have focused our development efforts on progressive, immune-mediated forms of ILD, with limited therapeutic options, where we believe efzofitimod can have disease modifying effects. These lung conditions are recognized as having a measurable immune-mediated pathology, involving both innate and adaptive immune mechanisms that contribute to pathogenesis, and can result in progressive disease leading to fibrosis and death.

Pulmonary Sarcoidosis

Sarcoidosis is an inflammatory disease of unknown cause, characterized by the formation of granulomas, clumps of inflammatory cells in one or more organs in the body. Sarcoidosis affects people of all ages, with the incidence peaking at 20 to 39 years of age. The disorder usually begins in the lungs, skin or lymph nodes, but can affect almost any organ. Sarcoidosis in the lungs is called pulmonary sarcoidosis and occurs in over 90% of sarcoidosis patients. Approximately 200,000 Americans are currently living with pulmonary sarcoidosis. The prognosis for patients with pulmonary sarcoidosis ranges from benign and self-limiting to chronic, debilitating fibrotic disease and death.

The immunopathogenesis of sarcoidosis is not yet well understood, but a hallmark of the disease is the presence of granulomas, or clumps of immune cells. Granulomas consist of epithelioid cells, lymphocytes (both T and B cells) and myeloid cells, with macrophages and multinucleated giant cells (formed by fusion of macrophages), both of myeloid origin, playing a central role in their formation and persistence. A leading hypothesis is that granuloma formation involves the interplay between antigen, human leukocyte antigen class II molecules, and T-cell receptors: a presumptive sarcoid antigen is engulfed by circulating antigen-presenting cells (APCs; macrophages, dendritic cells) and the subsequent interplay between APCs and CD4+ T-cells initiates granuloma formation. This process is accompanied by the release of inflammatory cytokines such as IFN-g and TNF-a from myeloid cells.

For patients with pulmonary sarcoidosis, the primary goal of treatment is to improve quality of life and avoid damage to organs. Efzofitimod may provide a therapeutic benefit in pulmonary sarcoidosis by resolving chronic inflammation, alleviating symptoms such as cough and shortness of breath and preventing disease progression towards fibrosis and permanent organ damage. Efzofitimod may also improve patient quality of life by allowing patients to reduce or completely avoid the need for oral corticosteroids (OCS), which are associated with debilitating side effects when used chronically. Efzofitimod targets the immune cells, primarily of myeloid lineage (monocytes, macrophages and dendritic cells), that drive the cellular pathology observed in pulmonary sarcoidosis. In preclinical studies, efzofitimod has been observed to inhibit cytokines involved in regulation of inflammatory and immune responses, modulating the reaction of myeloid cells at the sites of inflammation and attenuating T-cell activation. We have also discovered that efzofitimod's

receptor target NRP2 is up-regulated during differentiation and activation of myeloid cells including macrophages, dendritic cells and neutrophils. Furthermore, efzofitimod has been observed to significantly reduce lung inflammation and fibrosis and improve respiratory function parameters in bleomycin-induced animal models of ILD. We believe that by inhibiting the chronic inflammatory response in these patients, efzofitimod may be able to restore immune balance and prevent progressive fibrosis, without toxicity associated with current treatment options, thereby providing a safer, potentially more effective alternative to OCS and other immunosuppressive therapies that currently comprise the standard of care for patients with symptomatic pulmonary sarcoidosis.

Systemic Sclerosis

Systemic sclerosis (SSc, or scleroderma) is a chronic, progressive, autoimmune disease characterized by inflammation and fibrosis of connective tissues throughout the body, including the skin and other internal organs. SSc that occurs in the lungs is called SSc-ILD. It is estimated that approximately 100,000 people in the U.S. are affected by SSc and up to 80% may develop ILD. SSc-ILD is caused by chronic inflammation in the lungs and, if left untreated, can result in scarring, or fibrosis, that causes permanent loss of lung function. ILD is the primary cause of death in patients with SSc. Current treatment options are limited. They mainly focus on slowing lung function decline, do not improve patient symptoms and are associated with significant toxicity. New treatments are needed that can stabilize or improve lung function and improve patient quality of life.

Efzofitimod has been shown to reduce lung and skin fibrosis in an animal model of SSc. Certain cytokines central to the immune pathology of SSc-ILD, including IL-6, were also downregulated in both animal models of ILD and in humans in an adjacent ILD, pulmonary sarcoidosis, in our Phase 1b/2a study. Furthermore, NRP2 is expressed in the skin of patients with SSc. This data in both animal and human systems, along with our current understanding of the role of efzofitimod's target receptor NRP2 and the manner with which this novel ligand can modulate the immune response at the sites of inflammation, suggest it is a promising therapeutic candidate for SSc-ILD.

*Clinical Development*

Efzofitimod Phase 3 Clinical Trial – Pulmonary Sarcoidosis

We are conducting the EFZO-FIT study, which is a global Phase 3, multicenter, randomized, double-blind, placebo-controlled study to evaluate the efficacy and safety of IV efzofitimod 3.0 mg/kg and 5.0 mg/kg versus placebo in patients with symptomatic pulmonary sarcoidosis. It is a 52-week study with patients receiving either efzofitimod or placebo once a month for a total of 12 doses. The study is currently enrolling and intends to enroll adults with histologically confirmed pulmonary sarcoidosis receiving stable treatment with OCS, with or without immunosuppressant therapy. The study intends to enroll up to 264 patients at centers throughout the United States, Europe, Brazil and Japan. The study incorporates a forced steroid taper. The objective of the study is to evaluate the efficacy and safety of efzofitimod in patients with pulmonary sarcoidosis. The primary endpoint of the study is steroid reduction. Secondary endpoints include measures of lung function assessed by FVC and health-related quality of life assessments and questionnaires (KSQ lung score).

This study consists of three periods: a screening period, a 48-week placebo-controlled treatment period with the primary endpoint being measured at week 48, and a four-week follow-up period. Within the study, up to 264 patients will be randomized 1:1:1 to efzofitimod 3.0 mg/kg (N=88), efzofitimod 5.0 mg/kg (N=88) or placebo (N=88). Study drug is administered via IV infusion every four weeks for a total of 12 doses (48 weeks of treatment). Starting on Day 15 patients begin a taper (reduction) in OCS according to specific guidelines from their starting dose of 7.5-25 mg/day of prednisone (or equivalent) to a target dose of 0.0 mg/day. Patients will be followed for the remainder of the study to determine their ability to remain off of OCS. Patients who require an increase in OCS dose at any time in the study will continue to receive blinded study drug and be followed through to the end of the study.

In September 2022, we dosed the first patient in this study. Additionally, during 2023, we had a DSMB review of our EFZO-FIT study. The DSMB concluded that the study could continue unmodified. We expect to complete enrollment in the study in the second quarter of 2024.

In February 2024, we announced an Individual Patient EAP. The Individual Patient EAP has been initiated based on blinded EFZO-FIT study investigator and patient participant feedback. The program is designed to allow access for patients who complete the Phase 3 EFZO-FIT study and wish to receive treatment with efzofitimod outside of the clinical trial. The administration of efzofitimod as part of the Individual Patient EAP will occur independent of the EFZO-FIT study protocol, and we, principal investigators and patients will remain blinded to the treatment that occurred as part of the EFZO-FIT study. As this Individual Patient EAP will occur independent of the EFZO-FIT study, this program is not an open-label extension (OLE) and no long-term data will be collected by us.

Efzofitimod Phase 1b/2a Clinical Trial –Pulmonary Sarcoidosis

We designed a proof-of-concept Phase 1b/2a clinical trial for efzofitimod in patients with pulmonary sarcoidosis. The Phase 1b/2a clinical trial was a randomized, double-blind, placebo-controlled multiple-ascending dose, first-in-patient study with IV

efzofitimod in 37 patients. The study was conducted in patients with pulmonary sarcoidosis undergoing an OCS tapering regimen, in three cohorts of 12 patients each, at dose levels of 1.0 mg/kg, 3.0 mg/kg and 5.0 mg/kg.

The primary objective of the study was to evaluate safety and tolerability of multiple ascending doses of efzofitimod. Secondary objectives included assessment of the potential steroid-sparing effects of efzofitimod. In addition, efzofitimod's PK and immunogenicity following multiple dose administration were evaluated. Additional endpoints of interest included the exploratory assessment of the efficacy of efzofitimod for the treatment of pulmonary sarcoidosis by evaluating changes over time in: lung function assessed by forced vital capacity (FVC) and diffusing capacity of the lungs for carbon monoxide (DLCO); health-related quality of life assessments and questionnaires; and serum biomarkers of interest.

This study consisted of three staggered dose cohorts. Each cohort consisted of three periods: a screening period, a 20-week placebo-controlled treatment period, and a four-week follow-up period ending with final study assessments at Week 24. Within each cohort, 12 patients were randomized 2:1 to efzofitimod (N=8) or placebo (N=4). Study drug was administered via IV infusion every four weeks for a total of six doses (20 weeks of treatment). The efzofitimod doses levels being evaluated were 1 mg/kg, 3 mg/kg and 5 mg/kg. Starting on Day 15 patients began a taper (reduction) in OCS according to specific guidelines from their starting dose of 10-25 mg/day of prednisone (or equivalent) to a target dose of 5.0 mg/day, to be completed on or before Day 50. The OCS dose was tapered through Week 24 and patients were followed for the remainder of the study to determine their ability to maintain on this 5 mg dose. Optionally, further reductions in the OCS dose to below 5.0 mg/day may be attempted after the Week 16 visit, if determined by the investigator to be feasible. Patients who required an increase in OCS dose at any time in the study were to continue to receive blinded study drug and be followed through to the end of the study.

In September 2021, we announced positive results and clinical proof-of-concept from the Phase 1b/2a clinical trial in 37 patients with pulmonary sarcoidosis. These data were subsequently presented at the ATS International Conference and published in the peer reviewed journal *CHEST* in 2022. Efzofitimod was safe and well-tolerated at all doses with no drug-related serious adverse events or signal of immunogenicity. Additionally, the study demonstrated consistent dose response for efzofitimod on key efficacy endpoints and improvements compared to placebo, including measures of steroid reduction, lung function, sarcoidosis symptom measures and inflammatory biomarkers. Key safety and clinical efficacy findings for efzofitimod from the study include:

- Safe and well-tolerated at all doses:
    - No dose-relationship with most common adverse events associated with underlying disease;
    - No drug-related serious adverse events; and
    - No signal of immunogenicity.
- Dose response and consistent positive findings across key efficacy endpoints:
    - Steroid reduction of 58% overall from baseline and 22% relative reduction compared to placebo in steroid usage post taper in the 5.0 mg/kg treatment group;
    - Complete steroid taper to 0 mg achieved and maintained for 33% of patients in the 5.0 mg/kg treatment group compared to no patients in any other group;
    - Absolute improvement in FVC as a measure of lung function at week 24 of 3.3% in the 5.0 mg/kg treatment group compared to placebo, with an improvement in FVC of > 2.5%, considered clinically meaningful;
    - Clinically meaningful improvement over placebo observed for dyspnea (shortness of breath), cough, fatigue and the King's Sarcoidosis Scores for Lung and General Health in 5.0 mg/kg treatment group;
    - Dose dependent trends of improvement in key inflammatory biomarkers compared to placebo including IL-6, MCP-1, IFN-γ, IP-10 and TNF-□ as well as key sarcoidosis markers including ACE, IL-2Ra and SAA with tightest control in the 5.0 mg/kg treatment group; and
    - FDG-PET-CT was not evaluable due to incomplete data primarily caused by operational issues related to the COVID-19 pandemic.

In 2023, we published additional analyses of data from this study. This included a positive exposure response demonstrated for efzofitimod across multiple clinically relevant endpoints published in the peer-reviewed journal *Frontiers in Pharmacology* and a post-hoc analysis demonstrating statistically significant improvement in time to relapse, FVC and patient reported outcomes for efzofitimod presented at the European Respiratory Society (ERS) International Congress.

Efzofitimod Phase 2 Clinical Trial – SSc-ILD

During 2023, we initiated the EFZO-CONNECT study, a Phase 2 study of efzofitimod in patients with SSc-ILD. The EFZO-CONNECT study is a Phase 2 randomized, double-blind placebo-controlled proof-of-concept study to evaluate the efficacy, safety and tolerability of efzofitimod in patients with SSc-ILD. The study is a 28-week study with three parallel cohorts randomized 2:2:1 to either 270 mg or 450 mg of efzofitimod or placebo dosed IV monthly for a total of six doses. The study intends to enroll up to 25 patients at multiple centers in the United States. The objective of the study is to evaluate the efficacy of multiple doses of IV efzofitimod on pulmonary, cutaneous and systemic manifestations in patients with SSc-ILD. The primary endpoint is reduction of FVC. Secondary endpoints include certain measures regarding safety and tolerability. The study was initiated in the third quarter of 2023, and in October 2023, we dosed the first patient in this study.

Efzofitimod Phase 2 Clinical Trial – COVID-19 with Severe Respiratory Complications

In response to the COVID-19 pandemic, we conducted a Phase 2 clinical trial of efzofitimod in patients with COVID-19 related severe respiratory complications. The study was designed to evaluate the safety and preliminary efficacy of efzofitimod compared to placebo through the assessment of key clinical outcome measures. In early 2021, we reported positive data which showed that the trial met its primary endpoint of safety, demonstrating that a single, IV dose of efzofitimod was observed to be generally safe and well-tolerated in both the 1.0 and 3.0 mg/kg treatment groups. The study also showed a signal of activity in the 3.0 mg/kg cohort. In addition, patients treated with efzofitimod demonstrated a trend of overall improvement in key biomarkers analyzed compared to placebo. We are leveraging these data for our mechanistic understanding of efzofitimod and for its application in ILD.

Efzofitimod Phase 1 Clinical Trial – Healthy Volunteers

In June 2018, we announced results of our first-in-human Phase 1 clinical trial of efzofitimod conducted in Australia. This randomized, double-blind, placebo-controlled study evaluated the safety, tolerability, immunogenicity, and PK of IV efzofitimod in healthy volunteers. The Phase 1 clinical trial enrolled 36 healthy volunteers who were randomized to one of six sequential cohorts and received a single infusion of IV efzofitimod or placebo. Ascending efzofitimod doses by cohort ranged from 0.03 mg/kg to 5.0 mg/kg. The results indicate that the drug was observed to be generally well-tolerated at all dose levels tested, with no significant adverse events or induction of anti-drug antibodies observed following efzofitimod dosing or throughout the one-month follow-up period. The PK profile of efzofitimod following single-dose administration was linear across the evaluated dose range. Higher efzofitimod doses yielded sustained serum concentrations through the end of the one-month follow-up period that were above the predicted therapeutic threshold, supporting the potential for a once-monthly dosing regimen.

Kyorin Agreement

In January 2020, we entered into the Kyorin Agreement for the development and commercialization of efzofitimod for the treatment of ILD in Japan. Under the terms of the Kyorin Agreement, Kyorin received exclusive rights to develop and commercialize efzofitimod in Japan for all forms of ILD and is obligated to fund all research, development, regulatory, marketing and commercialization activities in Japan. We are responsible for supplying all drug product for Japan, as well as supporting development activities for efzofitimod. In 2020, Kyorin conducted and funded a Phase 1 clinical trial of efzofitimod (known as KRP-R120 in Japan). The Phase 1 trial was a placebo-controlled study to evaluate the safety, PK and immunogenicity of efzofitimod in 32 healthy Japanese male volunteers. Efzofitimod was observed to be generally well-tolerated with no drug-related serious adverse events, and PK findings were consistent with previous studies of efzofitimod. Kyorin is also participating in the EFZO-FIT study as the local sponsor in Japan. In February 2023, Kyorin dosed the first patient in Japan in the EFZO-FIT study which triggered a $10.0 million milestone payment to us. To date, the Kyorin Agreement has generated $20.0 million in upfront and milestone payments to us and we are eligible to receive up to an additional $155.0 million in the aggregate upon achievement of certain development, regulatory and sales milestones, as well as tiered royalties on any net sales in Japan.

Unless earlier terminated, the term of the Kyorin Agreement continues until the expiration of the royalty obligations. Either party may terminate the Kyorin Agreement in the event that the other party breaches the agreement and fails to cure the breach, becomes insolvent or challenges certain of the intellectual property rights licensed under the agreement.

**Our Discovery Platform**

*tRNA Synthetase Biology*

Extracellular tRNA synthetase biology represents a novel set of potential physiological modulators and therapeutic targets.

Using efzofitimod as a model, we have developed a process to advance novel tRNA synthetase domains from a concept to therapeutic candidate. This process leverages our early discovery work as well as current scientific understanding of tRNA synthetase evolution, protein structure, gene splicing and tissue-specific regulation to identify potentially active protein domains. Screening approaches are employed to identify target cells and extracellular receptors for these tRNA synthetase-derived proteins. These cellular systems can then be used in mechanism-of-action studies to elucidate the role these proteins play in cellular responses and their potential

therapeutic utility. We are working to identify new tRNA synthetase based drug candidates through our internal discovery efforts and other external collaboration efforts, including our collaboration with Dualsystems Biotech AG (Dualsystems). Dualsystems has agreed to utilize their proprietary receptor screening technology and research expertise to attempt to identify and validate new target receptors for tRNA synthetases. Through our internal research efforts, the Dualsystems collaboration and other external collaboration efforts, we intend to continue to advance our product development efforts within our tRNA synthetase biology platform.

*tRNA Synthetase Candidates*

Utilizing our novel approach, we have identified target receptors for domains of two additional tRNA synthetases, gaining insights into their potential biological activity in immunology and fibrosis. These fragments form the basis of our additional pipeline candidates. We plan to further elucidate the therapeutic potential of these candidates through mechanistic investigations, including *in vitro* and *in vivo* preclinical studies.

ATYR0101

ATYR0101 is a fusion protein derived from a domain of aspartyl-tRNA synthetase (DARS). ATYR0101 binds directly to latent-transforming growth factor beta-binding protein 1 (LTBP1), which regulates transforming growth factor beta (TGFβ), which is at the apex of fibrotic signaling. Derived from a naturally occurring tRNA synthetase, ATYR0101 interacts with LTBP1 in a unique way that presents a differentiated approach to targeting fibrosis. Early data suggest ATYR0101 exerts its antifibrotic effects by inducing apoptosis of myofibroblasts in a TGFβ dependent manner. We believe ATYR0101 may have broad therapeutic applications in multiple fibrotic diseases, such as pulmonary fibrosis, SSc, liver fibrosis and kidney fibrosis.

ATYR0750

ATYR0750 is a fusion protein derived from a domain of alanyl-tRNA synthetase (AARS). ATYR0750 is a novel ligand to fibroblast growth factor receptor 4 (FGFR4), which is involved in many cellular processes, including cell proliferation, differentiation, and tissue repair. FGFR4 is known to play a role in diseases related to inflammation and fibrosis, particularly in the liver. As a novel ligand, ATYR0750 interacts with FGFR4 in a differentiated way to other approaches targeting the receptor, which may lead to improved therapeutic benefit.

**Impact of Geopolitical and Macroeconomic Conditions**

Global economic and business activities continue to face widespread macroeconomic uncertainties, including global geopolitical tension, armed conflicts, potential future health pandemics, labor shortages, inflation and monetary supply shifts, liquidity concerns at, and failures of, banks and other financial institutions or other disruptions in the banking system or financing markets, higher interest rates and financial and credit market fluctuations, volatility in the capital markets and recession risks, disruptions to trade, commerce, pricing stability, credit availability and supply chain continuity globally. The ultimate long-term impact of these evolving geopolitical and macroeconomic conditions on our business is uncertain, although we continue to actively monitor the impact of these factors on our results of operations, financial condition and cash flows. The extent of the impact of these factors on our operational and financial performance, including our ability to execute our business strategies and initiatives in the expected timeframe, will depend on future developments, which are uncertain and cannot be predicted; however, any continued or renewed disruption resulting from these factors could negatively impact our business.

**Competition**

The biotechnology and pharmaceutical industries are intensely competitive. We will face competition with respect to our current product candidates and any other therapeutics we may develop or commercialize in the future, from pharmaceutical companies, biotechnology companies, universities and other research institutions. Our competitors may have substantially greater financial, technical and other resources, such as larger research and development staff and established marketing, sales and manufacturing organizations. Additional mergers and acquisitions in the biotechnology and pharmaceutical industries may result in even more resources being concentrated in our competitors. Competition may increase further as a result of advances in the commercial applicability of technologies and greater availability of capital for investment in these industries. Our competitors may succeed in developing, acquiring or licensing on an exclusive basis, drug products that are more effective, safer or less costly than any product candidate that we may develop.

Although we believe we are the only company engaged in the discovery and development of therapeutics based on novel functions of tRNA synthetases, we are aware of other companies that could compete with our product candidates as described below.

*Efzofitimod*

Our lead indication for efzofitimod is pulmonary sarcoidosis. For patients with pulmonary sarcoidosis, the primary goal of treatment is to improve the patient's quality of life and avoid danger to organs, such as development of scarring or fibrosis caused by

chronic inflammation. Currently, the only FDA-approved therapies for the treatment of sarcoidosis are glucocorticoids approved by FDA in the 1950s, prior to current regulatory standards. The consensus standard of care for pulmonary sarcoidosis is immunomodulatory therapy. First line treatment is typically with OCS that act mainly by suppressing inflammatory genes. OCS therapy has been shown to stabilize or improve disease symptoms in some patients, although relapse commonly occurs once OCS therapy is tapered or discontinued. Long-term OCS use is associated with significant side effects including substantial weight gain, development of insulin resistance, osteoporosis, and risk of infection. Alternatives, such as cytotoxic immunosuppressive agents (e.g., methotrexate) have been used as steroid-sparing agents, however, these therapies can also have significant side effects and toxicities, including serious infections and liver toxicity. Patients who have progressive disease despite OCS or other immunosuppressive therapy are sometimes given biologic immunomodulators, such as the tumor necrosis factor (TNF) inhibitors infliximab or adalimumab. These therapies are not approved by the FDA or other regulatory agencies for the treatment of sarcoidosis, and are also associated with serious potential side effects, including malignancy. The efficacy of these agents has not been well established clinically. Given the known toxicities of long-term OCS, immunosuppressive and immunomodulatory biologic therapeutic regimens, treatment of patients with sarcoidosis is limited to those who are symptomatic and whose disease is considered active. The presence of granulomas from sarcoidosis define the disease as active, and granulomatous inflammation is the major cause of fibrosis in pulmonary sarcoidosis. Studies to date have not clearly demonstrated that OCS or other immunomodulatory therapies prevent disease progression or formation of fibrosis. We believe there remains a substantial unmet need for safer, more effective therapies for sarcoidosis that could reduce or replace the requirement for long-term OCS or other immunosuppressive therapy. To our knowledge, efzofitimod is the most advanced drug candidate currently in development for the treatment pulmonary sarcoidosis.

Our second indication for efzofitimod is SSc-ILD. SSc-ILD is very difficult to treat, with limited options. Few randomized studies have been conducted, and first line standard of care remains off-label immunosuppressive agents, whose impact is modest and associated with significant side effects including malignancies. Despite not being approved for SSc-ILD, the immunosuppressants mycophenolate mofetil and cyclophosphamide are typically used as first-line treatment. Two products were recently approved for the treatment of SSc-ILD. Ofev® (nintedanib) marketed globally by Boehringer Ingelheim International GmbH, received FDA approval in 2019 for slowing the rate of decline in pulmonary function in patients with SSc-ILD. In 2020, the approval was further expanded to include patients with chronic fibrosing ILD with a progressive phenotype. Actemra® (tocilizumab) marketed globally by F. Hoffmann-La Roche Ltd. and Chugai Pharmaceutical Co Ltd., was approved by the FDA in 2021 for slowing the rate of decline in pulmonary function in adult patients with SSc-ILD. These therapies have demonstrated the ability to slow decline in lung function as measured by FVC in controlled clinical studies but are associated with significant side effects, continued symptoms, and progressive disease in the majority of patients. Rituximab, a biologic immunosuppressant targeting B-cells, is also used, but there is little clinical evidence supporting its efficacy in this indication.

If efzofitimod is successful for the treatment of pulmonary sarcoidosis and SSc-ILD, we believe it may have applications in other ILD indications and potentially in other severe immune disorders. Based on an analysis from an independent consultant that we engaged during 2022, we estimate that there is a $2-3 billion dollar global market opportunity in pulmonary sarcoidosis and Ssc-ILD and our own modeling.

There are a number of companies engaged in the clinical development of potential new treatments for ILD, including Boehringer Ingelheim International GmbH, F. Hoffman-La Roche Ltd., Merck & Co., Sanofi-Aventis LLC, Amgen Inc., GSK plc, and Kinevant Sciences GmbH, among others.

**Sales and Marketing**

We intend, where strategically appropriate, to build the commercial infrastructure necessary to effectively support the commercialization of our product candidates, if and when we believe a regulatory approval of the first of such product candidates in a particular geographic market appears imminent. We may elect to utilize strategic partners, distributors, or contract sales forces to assist in the commercialization of our product candidates in selected geographic locations or for particular indications. For example, we have licensed the rights to Kyorin to develop and commercialize efzofitimod in Japan.

Additional capabilities important to the marketing of therapeutics include the management of key stakeholders such as managed care organizations, group-purchasing organizations, specialty pharmacies, and government accounts. To develop the appropriate commercial infrastructure, we will have to invest significant amounts of financial and management resources, some of which will be committed prior to any confirmation that any of our product candidates will be approved.

**Manufacturing**

We currently contract with third parties for the manufacturing and testing of our product candidates, including efzofitimod, to support preclinical studies and clinical trials, and we intend to do so in the future. We do not own or operate manufacturing or testing facilities for the clinical or commercial production of our product candidates. We currently have no plans to build our own clinical or commercial scale manufacturing capabilities. The use of contracted development and manufacturing organizations (CDMOs) is

cost-efficient and has eliminated the need for our direct investment in manufacturing facilities and additional resources early in development. Although we rely on CDMOs, we employ personnel with extensive biologics development and manufacturing experience to oversee such CDMOs.

Efzofitimod is a fusion protein that is expressed in recombinant *E.coli.* We have worked with CDMOs in the United States and internationally on the development and manufacture of products using current Good Manufacturing Practices (cGMP) to produce drug substance and drug product to support preclinical and clinical development. We have also contracted with CDMOs to conduct the labeling, storage and distribution of our drug product candidates to clinical sites.

To date, our CDMOs have met our manufacturing and testing requirements for clinical development and we expect that our current supply chain is capable of providing sufficient quantities of our product candidates to meet our anticipated clinical development needs. Currently we have sufficient efzofitimod on hand to meet our projected needs for the EFZO-FIT (and related Individual Patient EAP) and EFZO-CONNECT studies. Additionally, during 2023, the CDMO that we engaged during late 2021 completed its first and second full, commercial-scale bulk drug substance GMP runs. Quality release testing has been completed and all release specifications were met, supporting the CDMO's ability to produce bulk drug substance of efzofitimod for commercial purposes if we receive regulatory approval for efzofitimod. We will need to demonstrate that the drug substance manufactured by this CDMO is comparable in quality, safety and potency to the drug substance manufactured by our previous CDMO, which is currently being used in the EFZO-FIT and EFZO-CONNECT studies.

**Patents and Proprietary Rights**

We strive to protect the proprietary technologies that we believe are important to our business, including seeking and maintaining patent protection intended to cover the composition of matter of our product candidates, their methods of use, related technology and other inventions that are important to our business. We own, or have exclusive licenses to, over 300 issued patents or allowed patent applications with predicted expiration dates ranging from 2026 to 2034. In addition to patent protection, we also rely on trade secrets and careful monitoring of our proprietary information to protect aspects of our business that are not amenable to, or that we do not consider appropriate for, patent protection.

Our success will depend significantly on our ability to obtain and maintain patent and other proprietary protection for commercially important technology, inventions and know-how related to our business, defend and enforce our patents, maintain our licenses to use intellectual property owned by third parties, preserve the confidentiality of our trade secrets and operate without infringing the valid and enforceable patents and other proprietary rights of third parties. We also rely on know-how, continuing technological innovation and in-licensing opportunities to develop, strengthen, and maintain our proprietary position in the field of extracellular tRNA synthetase biology, their receptors and associated signaling pathways, including, for example, antibody diagnostics and therapeutics to NRP2.

A third party may hold intellectual property, including patent rights, which is important or necessary to the development of our products. It may be necessary for us to use the patented or proprietary technology of third parties to commercialize our products, in which case we would be required to obtain a license from these third parties on commercially reasonable terms, or our business could be harmed, possibly materially.

We plan to continue to expand our intellectual property estate by filing patent applications directed to new methods of treatment, therapeutics and additional new product forms thereof with new therapeutic or pharmacokinetic properties. Specifically, we seek patent protection in the United States and internationally for novel compositions of matter covering our protein therapeutics, antibody therapeutics, next generation product forms and the use of these compositions in a variety of therapies.

The patent positions of biopharmaceutical companies like us are generally uncertain and involve complex legal, scientific and factual questions. In addition, the coverage claimed in a patent application can be significantly reduced before the patent is issued, and its scope can be reinterpreted after issuance. Consequently, we do not know whether any of our product candidates will be protectable or remain protected by enforceable patents. We cannot predict whether the patent applications we are currently pursuing will issue as patents in any particular jurisdiction or whether the claims of any issued patents will provide sufficient proprietary protection from competitors. Any patents that we hold may be challenged, circumvented or invalidated by third parties.

Because patent applications in the United States and certain other jurisdictions are maintained in secrecy for 18 months, and since publication of discoveries in the scientific or patent literature often lags behind actual discoveries, we cannot be certain of the priority of inventions covered by pending patent applications. Moreover, we may have to participate in interference proceedings declared by the United States Patent and Trademark Office (USPTO), or a foreign patent office to determine priority of invention or in post-grant challenge proceedings, such as oppositions, that challenge priority of invention or other features of patentability. Such proceedings could result in us incurring substantial costs, even if the eventual outcome is favorable to us.

*Efzofitimod*

Our efzofitimod patent portfolio is comprised of a number of patent families related to derivatives of HARS, including the HARS amino 1-60, related splice variants, combinations with other therapeutics, and next-generation product forms with modified therapeutic activity or pharmacokinetic characteristics. Our efzofitimod patent portfolio includes a patent family that is jointly owned by us and our 98% owned subsidiary, Pangu BioPharma, and includes issued patents in the United States, Australia, Canada, China, Europe, Hong Kong and Japan, and pending patent applications in the United States. The U.S. patents are expected to expire between 2030 and 2031, absent any patent term extension for regulatory delays, and the ex-U.S. patents, and patents that issue from these patent applications, if any, are expected to expire in 2030, absent any patent term extension.

The efzofitimod patent portfolio includes another patent family jointly owned by us and Pangu BioPharma, which includes patent applications directed to related splice variants of HARS. This patent family includes issued patents in the United States, Australia, Canada, China, Europe, Hong Kong, Japan and New Zealand. The issued patents are expected to expire in 2031, absent any patent term extension.

Also included within the efzofitimod patent portfolio are issued patents and pending patent applications directed to specific product forms of efzofitimod, and other HARS splice variants, including patent families directed to Fc fusion proteins, and combinations for treating lung inflammation, among other indications. One family directed to specific Fc fusion proteins includes issued or allowed patents in the United States, Australia, Canada, Europe, Hong Kong, India and Japan, and pending patent applications in the United States and Japan. A patent family directed to combination therapies includes an issued patent in the United States, and pending patent applications in the United States, Australia, Canada, China, Europe, Hong Kong and Japan. If issued, the patents that derive from the patent applications are predicted to expire between 2034 and 2038, absent any patent term extensions.

*tRNA Synthetases*

Our pipeline of extracellular tRNA synthetase proteins is covered by a series of patent families, which are directed to all 20 human cytosolic tRNA synthetases. Numerous patents are issued in the United States and elsewhere, including issued U.S. patents directed to specific therapeutic protein compositions, the corresponding protein polynucleotide sequences, and certain antibody compositions to specific splice variants. These cases are jointly owned by us and Pangu BioPharma, and include issued patents and/or pending applications in the United States, Australia, Canada, Europe, China and Japan. Patents that issue from these applications, if any, would be expected to expire in 2031, absent any patent term extension. Additional patent applications have also been separately filed (or are in preparation) on the splice variants, and optimized sequences derived from GARS (Glycyl-tRNA synthetase), DARS, YARS (tyrosyl-tRNA synthetase), and other tRNA synthetases, and any patents issuing from these patent applications are expected to expire between 2026 and 2030, absent any patent term extension.

The term of individual patents depends upon the legal term of the patents in the countries in which they are obtained. In most countries in which we file, the patent term is generally 20 years from the earliest date of filing the non-provisional patent application from which the patent issued.

In the United States, the patent term of a patent that covers a drug approved by the FDA, may also be eligible for patent term extension, which permits patent term restoration as compensation for the patent term lost during the FDA regulatory review process. The Hatch-Waxman Act permits a patent term extension of up to five years beyond the expiration of the patent. The length of the patent term extension is related to the length of time the drug is under regulatory review. Patent extension cannot extend the remaining term of a patent beyond a total of 14 years from the date of product approval and only one patent applicable to an approved drug may be extended. Similar provisions are available in Europe and other non-United States jurisdictions to extend the term of a patent that covers an approved drug. In the future, if and when our pharmaceutical products receive FDA approval, we expect to apply for patent term extensions on patents covering those products. We intend to seek patent term extensions to any of our issued patents in any jurisdiction where these are available, however there is no guarantee that the applicable authorities, including the FDA in the United States, will agree with our assessment of whether such extensions should be granted, and even if granted, the length of such extensions.

We also rely on trade secret protection for our confidential and proprietary information. Although we take steps to protect our proprietary information and trade secrets, including through contractual means with our employees and consultants, third parties may independently develop substantially equivalent proprietary information and techniques or otherwise gain access to our trade secrets or disclose our technology. Thus, we may not be able to meaningfully protect our trade secrets. It is our policy to require our employees, consultants, outside scientific collaborators, sponsored researchers and other advisors to execute confidentiality agreements upon the commencement of employment or consulting relationships with us. These agreements provide that all confidential information concerning our business or financial affairs developed or made known to the individual during the course of the individual's relationship with us is to be kept confidential and not disclosed to third parties except in specific circumstances. In the case of employees, the agreements provide that all inventions conceived by the individual, and which are related to our current or planned business or research

and development or made during normal working hours, on our premises or using our equipment or proprietary information, are our exclusive property.

**Government Regulation**

Government authorities in the United States, including federal, state, and local authorities, and in other countries, extensively regulate, among other things, the manufacturing, research and clinical development, marketing, labeling and packaging, storage, distribution, post-approval monitoring and reporting, advertising and promotion, and export and import of biological products, such as those we are developing. Pricing of such products is also subject to regulation in many countries. The process of obtaining regulatory approvals and the subsequent compliance with appropriate federal, state, local, and foreign statutes and regulations require the expenditure of substantial time and financial resources.

***U.S. Government Regulation***

In the United States, the FDA regulates biologics under the Federal Food, Drug, and Cosmetic Act and the Public Health Service Act and their implementing regulations. FDA approval is required before any new unapproved biologic or dosage form, including a new use of a previously approved biologic, can be marketed in the United States. Biologics are also subject to other federal, state, and local statutes and regulations. If we fail to comply with applicable FDA or other requirements at any time during the product development process, clinical testing, approval process or after approval, we may become subject to administrative or judicial sanctions. These sanctions could include the FDA's refusal to approve pending applications, license suspension or revocation, untitled or warning letters, product recalls, product seizures, total or partial suspension of production or distribution, injunctions, fines, civil penalties or criminal prosecution. Any FDA enforcement action could have a material adverse effect on us.

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

- completion of extensive preclinical laboratory tests and preclinical animal studies, performed in accordance with the good laboratory practice regulations, where applicable;
- submission to the FDA of an IND which must become effective before human clinical trials may begin and must be updated annually;
- approval by an independent institutional review board (IRB) or ethics committee representing each clinical site before each clinical trial may be initiated;
- performance of adequate and well-controlled human clinical trials to establish the safety and efficacy of the product candidate for each proposed indication and conducted in accordance with good clinical practice (GCP) requirements;
- preparation of and submission to the FDA of a biologics license application (BLA) after completion of all pivotal clinical trials;
- potential review of the product application by an FDA advisory committee, where appropriate and if applicable;
- a determination by the FDA within 60 days of its receipt of a BLA to file the application for review;
- satisfactory completion of an FDA pre-approval inspection of the manufacturing facilities where the proposed product is produced to assess compliance with cGMP;
- potential FDA audit of the clinical trial sites that generated the data in support of the BLA; and
- FDA review and approval of a BLA prior to any commercial marketing or sale of the product in the United States.

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

An IND is a request for authorization from the FDA to administer an investigational new drug or biologic product to humans in clinical trials. The IND submission includes the general investigational plan and the protocol(s) for human trials. The IND also includes results of preclinical testing, including animal and *in vitro* studies, to assess the toxicology, PK, pharmacology, and pharmacodynamic characteristics of the product; chemistry, manufacturing, and controls information; and any available human data or literature to support the use of the investigational new drug. An IND must become effective before human clinical trials may begin. An IND will automatically become effective 30 days after receipt by the FDA, unless before that time the FDA raises concerns or questions related to the proposed clinical trials. In such a case, the IND may be placed on clinical hold and the IND sponsor and the FDA must resolve any outstanding concerns or questions before clinical trials can begin. Accordingly, submission of an IND may or may not result in the FDA allowing clinical trials to commence. The FDA may impose a clinical hold at any time during a clinical trial and may impose a

partial clinical hold that would apply certain limits to the trial, for example, imposing dosage limitations or restricting the timeframe of the trial.

*Clinical Trials*

Clinical trials involve the administration of the investigational new drug to human subjects under the supervision of qualified investigators in accordance with GCPs which include the requirement that all research subjects provide their informed consent for their participation in any clinical trial. Clinical trials are conducted under protocols detailing, among other things, the objectives of the study, the parameters to be used in monitoring safety, and the efficacy criteria to be evaluated. A protocol for each clinical trial and any subsequent protocol amendments must be submitted to the FDA as part of the IND. Additionally, approval must also be obtained from each clinical trial site's IRB before the clinical trials may be initiated, and the IRB must monitor the trial until it is completed. There are also requirements governing the reporting of ongoing clinical trials and clinical trial results to public registries.

The clinical investigation of a drug is generally divided into three phases. Although the phases are usually conducted sequentially, they may overlap or be combined.

- Phase 1. The drug is initially introduced into a relatively small number of healthy human subjects or patients with the target disease or condition. These studies are designed to evaluate the safety, dosage tolerance, metabolism and pharmacologic actions of the investigational new drug in humans, the side effects associated with increasing doses, and if possible, to gain early evidence on effectiveness.
- Phase 2. The drug is administered to a limited patient population to evaluate dosage tolerance and optimal dosage, identify possible adverse side effects and safety risks, and preliminarily evaluate efficacy. Multiple Phase 2 clinical trials may be conducted by the sponsor to obtain information prior to beginning larger and more costly Phase 3 clinical trials.
- Phase 3. The drug is administered to an expanded patient population, generally at geographically dispersed clinical trial sites to generate enough data to evaluate dosage, clinical effectiveness and safety, and establish the overall benefit-risk relationship of the investigational new drug product. A well-controlled, statistically robust Phase 3 trial may be designed to deliver the data that regulatory authorities will use to decide whether or not to approve, and, if approved, how to appropriately label a drug: such Phase 3 studies are referred to as "pivotal."

In some cases, the FDA may condition approval of a BLA for a product candidate on the sponsor's agreement to conduct additional clinical trials after approval. In other cases, a sponsor may voluntarily conduct additional clinical trials after approval to gain more information about the drug. Such post-approval studies are typically referred to as Phase 4 clinical trials. Failure to exhibit due diligence with regard to conducting Phase 4 clinical trials that the FDA requires as a condition of approval could result in FDA withdrawing approval for the product.

A clinical trial sponsor must submit written IND safety reports to the FDA and the investigators for serious and unexpected adverse reactions, any clinically important increase in the rate of a serious suspected adverse reaction over that listed in the protocol or investigator's brochure, or any findings from other studies or animal or *in vitro* testing that suggest a significant risk in humans exposed to the product candidate within 15 calendar days after the sponsor determines that the information qualifies for reporting. The sponsor also must notify the FDA of any unexpected fatal or life-threatening suspected adverse reaction within seven calendar days after the sponsor's initial receipt of the information. The FDA, the IRB, or the clinical trial sponsor may suspend or terminate a clinical trial at any time on various grounds, including a finding that the research subjects are being exposed to an unacceptable health risk. 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 or not a trial may move forward at designated check points based on access to certain data from the trial. We may also suspend or terminate a clinical trial based on evolving business objectives or competitive climate.

*BLA Submission*

Assuming successful completion of all required testing in accordance with all applicable regulatory requirements, detailed information about the investigational biologic product is submitted to the FDA in the form of a BLA requesting approval to market the product for one or more indications. Efzofitimod and our other potential product candidates are proteins that will be regulated as biological products subject to the BLA marketing pathway. Under federal law, the submission of most BLAs is subject to an application user fee, and the sponsor of an approved BLA is also subject to an annual prescription drug product program fee. These fees typically increase annually. Applications for orphan drug products are exempted from the BLA user fees, unless the application includes an indication for other than a rare disease or condition.

A BLA must include all relevant data available from pertinent preclinical studies and clinical trials, including negative or ambiguous results as well as positive findings, together with detailed information relating to the product's chemistry, manufacturing, controls, and proposed labeling, among other things. To support marketing approval, the data submitted must be sufficient in quality and quantity to establish the safety and effectiveness of the investigational new drug product to the satisfaction of the FDA. FDA approval of a BLA must be obtained before a biologic may be marketed in the United States.

Before approving a BLA, the FDA typically will conduct a pre-approval inspection of the facility or facilities where the product is manufactured. The FDA will not approve an application unless it determines that the manufacturing processes and facilities are in compliance with cGMP requirements and adequate to assure consistent production of the product within required specifications. Additionally, before approving a BLA, the FDA will typically inspect one or more clinical sites to assure compliance with GCP.

Additionally, the FDA may refer any NDA or BLA, including applications for novel biologic candidates which present difficult questions of safety or efficacy, to an advisory committee. Typically, an advisory committee is a panel of independent experts, including clinicians and other scientific experts, that reviews, evaluates and provides a recommendation as to whether the application should be approved and under what conditions. The FDA is not bound by the recommendations of an advisory committee, but it considers such recommendations carefully when making decisions.

*The FDA's Decision on a BLA*

The FDA evaluates a BLA to determine whether the data demonstrate that the biologic is safe, pure, and potent, or effective. After the FDA evaluates the BLA and conducts inspections of manufacturing facilities where the product will be produced, it may issue an approval letter or a Complete Response Letter (CRL). An approval letter authorizes commercial marketing of the drug with specific prescribing information for specific indications. A CRL indicates that the review cycle of the application is complete and the application is not ready for approval. A CRL generally outlines the deficiencies in the submission and may require substantial additional testing or information in order for the FDA to reconsider the application. A CRL may require additional clinical data or an additional pivotal Phase 3 clinical trial(s), or other significant, expensive and time-consuming requirements related to clinical trials, preclinical studies or manufacturing. Even with the submission of this additional information, however, the FDA may ultimately decide that the BLA does not satisfy the criteria for approval and issue a denial.

The FDA could also approve the BLA with a Risk Evaluation and Mitigation Strategy plan to mitigate risks associated with the product, which could include medication guides, physician communication plans, or elements to assure safe use, such as restricted distribution methods, patient registries and other risk minimization tools. The FDA may also condition approval on, among other things, changes to proposed labeling, development of adequate controls and specifications, or a commitment to conduct one or more post-market studies or clinical trials. Such post-market testing may include Phase 4 clinical trials and surveillance to further assess and monitor the product's safety and effectiveness after commercialization. Also, new government requirements, including those resulting from new legislation, may be established, or the FDA's policies may change, which could delay or prevent regulatory approval of our products under development.

*Expedited Review and Accelerated Approval Programs*

A sponsor may seek approval of its product candidate under programs designed to accelerate FDA's review and approval of NDAs and BLAs. For example, Fast Track designation may be granted to a drug or biologic intended for treatment of a serious or life-threatening disease or condition that has potential to address unmet medical needs for the disease or condition by providing a therapy where none exists or a therapy that may be potentially superior to existing therapy based on efficacy or safety factors. The key benefits of Fast Track designation are more frequent interactions with the FDA during development and testing and eligibility for priority review. The FDA may also review sections of the NDA or BLA for a Fast Track product on a rolling basis before the complete application is submitted, if the sponsor and the FDA agree on a schedule for the submission of the application sections, and the sponsor pays any required user fees upon submission of the first section of the application. Based on results of the Phase 3 clinical trial(s) submitted in a BLA, the FDA may grant the BLA a priority review designation, which sets the target date for FDA action on the application at six months after the FDA accepts the application for filing. Priority review is granted where there is evidence that the proposed product would be a significant improvement in the safety or effectiveness of the treatment, diagnosis, or prevention of a serious condition. If criteria are not met for priority review, the application is subject to the standard FDA review period of ten months after FDA accepts the application for filing. Priority review designation does not change the scientific/medical standard for approval or the quality of evidence necessary to support approval. Fast Track designation may be withdrawn by the sponsor or rescinded by the FDA if the designation is no longer supported by data emerging in the clinical trial process.

Under the accelerated approval program, the FDA may approve a BLA on the basis of either a surrogate endpoint that is reasonably likely to predict clinical benefit or, on a clinical endpoint that can be measured earlier than irreversible morbidity or mortality, that is reasonably likely to predict an effect on irreversible morbidity or mortality or other clinical benefit, taking into account the severity, rarity, or prevalence of the condition and the availability or lack of alternative treatments. Drugs and biologics granted

accelerated approval must meet the same statutory standards for safety and effectiveness as those granted traditional approval. Post-marketing trials or completion of ongoing trials after marketing approval are generally required to verify the drug's clinical benefit in relationship to the surrogate endpoint or ultimate outcome in relationship to the clinical benefit. In addition, a sponsor may seek FDA designation of its product candidate as a breakthrough therapy if the drug is intended, alone or in combination with one or more other drugs, to treat a serious or life-threatening disease or 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. If so designated, the FDA shall act to expedite the development and review of the product's marketing application, including by meeting with the sponsor throughout the product's development, providing timely advice to the sponsor to ensure that the development program to gather preclinical and clinical data is as efficient as practicable, involving senior managers and experienced review staff in a cross-disciplinary review, and assigning a cross-disciplinary project lead for the FDA review team to facilitate an efficient review of the development program and to serve as a scientific liaison between the review team and the sponsor.

*Post-Approval Requirements*

Drugs manufactured or distributed pursuant to FDA approvals are subject to pervasive and continuing regulation by the FDA, including, among other things, requirements relating to recordkeeping, periodic reporting, product sampling and distribution, advertising and promotion and reporting of adverse experiences with the product. After approval, most changes to the approved product, such as adding new indications or other labeling claims or some changes to the manufacturing process, are subject to prior FDA review and approval.

Drug manufacturers are subject to periodic unannounced inspections by the FDA and state agencies for compliance with cGMP requirements.

We rely, and expect to continue to rely, on third parties for the production of clinical quantities of our product candidates, and expect to rely in the future on third parties for the production of commercial quantities. Future FDA and state inspections may identify compliance issues at our facilities or at the facilities of our contract manufacturers that may disrupt production or distribution, or require substantial resources to correct. In addition, discovery of previously unknown problems with a product or the failure to comply with applicable requirements may result in restrictions on a product, manufacturer or holder of an approved BLA, including withdrawal or recall of the product from the market or other voluntary, FDA-initiated or judicial action that could delay or prohibit further marketing, or result in the imposition of post-market studies or trials to assess new safety risks.

The FDA strictly regulates marketing, labeling, advertising, and promotion of products that are placed on the market. Drugs 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.

*Orphan Designation and Exclusivity*

The FDA may grant orphan drug designation to drugs intended to treat a rare disease or condition that affects fewer than 200,000 individuals in the United States, or if it affects more than 200,000 individuals in the United States and for which there is no reasonable expectation that the cost of developing and making a drug for this type of disease or condition will be recovered from sales in the United States. 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, but it 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 is the first to receive FDA approval for the indication for which it has orphan designation, the product is entitled to orphan drug exclusivity, which means the FDA may not approve any other application to market the same drug for the same indication for a period of seven years, except in limited circumstances, such as a showing of clinical superiority over the product with orphan exclusivity. Orphan drug exclusivity, however, also could block the approval of one of our products for seven years if a competitor obtains approval of the same drug as defined by the FDA for treatment of the same indication or disease.

*Pediatric Trials and Exclusivity*

Under the Pediatric Research Equity Act of 2003, as amended, BLAs or supplement to a BLA must contain data that are adequate to assess the safety and effectiveness of an investigational drug or biologic product for the claimed indications in all relevant pediatric populations and to support dosing and administration for each pediatric subpopulation for which the drug is safe and effective. A sponsor who is planning to submit a marketing application for a drug product that includes a new active ingredient, new indication, new dosage form, new dosing regimen or new route of administration must submit an initial Pediatric Study Plan (PSP) within sixty days of an

end-of-phase 2 meeting or, if there is no such meeting, as early as practicable before the initiation of the Phase 3 or Phase 2/3 clinical trial. The initial PSP must include an outline of the pediatric study or studies that the sponsor plans to conduct, including study objectives and design, age groups, relevant endpoints and statistical approach, or a justification for not including such detailed information, and any request for a deferral of pediatric assessments or a full or partial waiver of the requirement to provide data from pediatric studies along with supporting information. The FDA may, on its own initiative or at the request of the applicant, grant deferrals for submission of some or all pediatric data until after approval of the product for use in adults or full or partial waivers if certain criteria are met. The FDA and the sponsor must reach agreement on the PSP. A sponsor can submit amendments to an agreed-upon initial PSP at any time if changes to the pediatric plan need to be considered based on data collected from preclinical studies, early phase clinical trials, and/or other clinical development programs. The requirements for pediatric data do not apply to any drug or biologic for an indication for which orphan designation has been granted, except under certain circumstances.

Pediatric exclusivity is another type of non-patent exclusivity in the United States and, if granted, provides for the attachment of an additional six months of marketing protection to the term of any existing regulatory exclusivity, including orphan exclusivity. This six-month exclusivity may be granted if a BLA sponsor submits pediatric data that fairly respond to a written request from the FDA for such data.

***Rest of World Government Regulation***

In addition to regulations in the United States, we will be subject to a variety of regulations in other jurisdictions governing, among other things, clinical trials and any commercial sales and distribution of our products. The cost of establishing a regulatory compliance system for numerous varying jurisdictions can be very significant. Although many of the issues discussed above with respect to the United States apply similarly in the context of the European Union and in other jurisdictions, the approval process varies between countries and jurisdictions and can involve additional product testing and additional administrative review periods. The time required to obtain approval in other countries and jurisdictions might differ from and be longer than that required to obtain FDA approval. Regulatory approval in one country or jurisdiction does not ensure regulatory approval in another, but a failure or delay in obtaining regulatory approval in one country or jurisdiction may negatively impact the regulatory process in others.

Whether or not we obtain FDA approval for a product, we must obtain the requisite approvals from regulatory authorities in foreign countries prior to the commencement of clinical trials or marketing of the product in those countries. Certain countries outside of the United States have a similar process that requires the submission of a clinical trial application much like the IND prior to the commencement of human clinical trials. In the EU, for example, a clinical trial authorization application (CTA) must be submitted for each clinical protocol to each country's national health authority and an independent ethics committee, much like the FDA and IRB, respectively. Once the CTA is accepted in accordance with a country's requirements, the clinical trial may proceed.

The requirements and process governing the conduct of clinical trials vary from country to country. In all cases, the clinical trials are conducted in accordance with GCP the applicable regulatory requirements, and the ethical principles that have their origin in the Declaration of Helsinki.

***Pharmaceutical Coverage, Pricing and Reimbursement***

Significant uncertainty exists as to the coverage and reimbursement status of any products for which we obtain regulatory approval. In the United States and in other countries, sales of any products for which we receive regulatory approval for commercial sale will depend in part on the availability of coverage and reimbursement from third-party payors. Third-party payors include government authorities, managed care providers, private health insurers and other organizations. Private payors often follow Centers for Medicare & Medicaid Services (CMS's) determinations relating to Medicare and Medicaid with respect to coverage policy and payment limitations in setting their own reimbursement policies. The process for determining whether a payor will provide coverage for a product may be separate from the process for setting the reimbursement rate that the payor will pay for the product. Third-party payors may limit coverage to specific products on an approved list, or formulary, which might not include all of the FDA-approved products for a particular indication. Moreover, a payor's decision to provide coverage for a drug product does not imply that an adequate reimbursement rate will be approved. Adequate third-party reimbursement may not be available or sufficient to enable us to maintain price levels sufficient to realize an appropriate return on our investment in product development.

Third-party payors are increasingly challenging the price and examining the medical necessity and cost-effectiveness of medical products and services, in addition to their safety and efficacy. In order to obtain coverage and reimbursement for any product that might be approved for sale, we may need to conduct expensive pharmacoeconomic studies in order to demonstrate the medical necessity and cost-effectiveness of our products, in addition to the costs required to obtain regulatory approvals. Our product candidates may not be considered medically necessary or cost-effective. If third-party payors do not consider a product to be cost-effective compared to other available therapies, they may not cover the product after approval as a benefit under their plans or, if they do, the level of payment may not be sufficient to allow a company to sell its products at a profit.

The U.S. 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. By way of example, the Patient Protection and Affordable Care Act, as amended by the Health Care and Education Reconciliation Act of 2010 (collectively, the ACA) contains provisions that may reduce the profitability of drug products, including, for example, increased rebates for drugs sold to 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. There have been executive, judicial and Congressional challenges to certain aspects of the ACA. For example, legislation enacted in 2017, informally titled the Tax Cuts and Jobs Act of 2017, included a provision which repealed, effective January 1, 2019, the tax-based shared responsibility payment imposed by the ACA on certain individuals who fail to maintain qualifying health coverage for all or part of a year that is commonly referred to as the "individual mandate." On June 17, 2021, the Supreme Court dismissed a challenge on procedural grounds that argued the ACA is unconstitutional in its entirety because the "individual mandate" was repealed by Congress. Further, on August 16, 2022, President Biden signed the Inflation Reduction Act of 2022 (IRA) into law, which among other things, extends enhanced subsidies for individuals purchasing health insurance coverage in ACA marketplaces through plan year 2025. The IRA also eliminates the "donut hole" under the Medicare Part D program beginning in 2025 by significantly lowering the beneficiary maximum out-of-pocket cost and creating a new manufacturer discount program. It is possible that the ACA will be subject to judicial or Congressional challenges in the future. It is unclear how any such challenges and the healthcare reform measures of the Biden administration will impact the ACA and our business.

Prior to the Supreme Court ruling, on January 28, 2021, President Biden issued an executive order to initiate a special enrollment period for purposes of obtaining health insurance coverage through the ACA marketplace. The executive order also instructed certain governmental agencies to review and reconsider their existing policies and rules that limit access to healthcare, including among others, reexamining Medicaid demonstration projects and waiver programs that include work requirements, and policies that create unnecessary barriers to obtaining access to health insurance coverage through Medicaid or the ACA. It is possible that the ACA will be subject to judicial or Congressional challenges in the future. It is unclear how any such challenges and the healthcare reform measures of the Biden administration will impact the ACA and our business.

In addition, there has been heightened governmental scrutiny in the United States of pharmaceutical pricing practices in light of the rising cost of prescription drugs and biologics. Such scrutiny has resulted in several recent congressional inquiries and proposed and enacted federal and state legislation designed to, among other things, bring more transparency to product pricing, review the relationship between pricing and manufacturer patient programs, and reform government program reimbursement methodologies for products. For example, in July 2021, the Biden administration released an executive order, "Promoting Competition in the American Economy," with multiple provisions aimed at prescription drugs. In response to Biden's executive order, on September 9, 2021, the Department of Health and Human Services (HHS) released a Comprehensive Plan for Addressing High Drug Prices that outlines principles for drug pricing reform and sets out a variety of potential legislative policies that Congress could pursue as well as potential administrative actions HHS can take to advance these principles. In addition, the IRA, among other things (i) directs HHS to negotiate the price of certain high-expenditure, single-source drugs and biologics covered under Medicare and (ii) imposes rebates under Medicare Part B and Medicare Part D to penalize price increases that outpace inflation. These provisions take effect progressively starting in fiscal year 2023. On August 29, 2023, HHS announced the list of the first ten drugs that will be subject to price negotiations, although the Medicare drug price negotiation program is currently subject to legal challenges. In response to the Biden administration's October 2022 executive order, on February 14, 2023, HHS released a report outlining three new models for testing by the CMS Innovation Center which will be evaluated on their ability to lower the cost of drugs, promote accessibility, and improve quality of care. It is unclear whether the models will be utilized in any health reform measures in the future. Further, on December 7, 2023, the Biden administration announced an initiative to control the price of prescription drugs through the use of march-in rights under the Bayh-Dole Act. On December 8, 2023, the National Institute of Standards and Technology published for comment a Draft Interagency Guidance Framework for Considering the Exercise of March-In Rights which for the first time includes the price of a product as one factor an agency can use when deciding to exercise march-in rights. While march-in rights have not previously been exercised, it is uncertain if that will continue under the new framework. At the state level, legislatures have increasingly passed legislation and implemented regulations designed to control pharmaceutical and biological product pricing, including price or patient reimbursement constraints, discounts, restrictions on certain product access and marketing cost disclosure and transparency measures, and, in some cases, designed to encourage importation from other countries and bulk purchasing. Additional state and federal healthcare reform measures may be adopted in the future.

In the European Community, governments influence the price of pharmaceutical products through their pricing and reimbursement rules and control of national health care systems that fund a large part of the cost of those products to consumers. Some jurisdictions operate positive and negative list systems under which products may only be marketed once a reimbursement price has been agreed to by the government. To obtain reimbursement or pricing approval, some of these countries may require the completion of clinical trials that compare the cost-effectiveness of a particular product candidate to currently available therapies. Other member states allow companies to fix their own prices for medicines, but monitor and control company profits. The downward pressure on health care costs in general, particularly prescription drugs, has become very intense. As a result, increasingly higher barriers are being erected to

the entry of new products. In addition, in some countries, cross-border imports from low-priced markets exert a commercial pressure on pricing within a country.

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. In addition, an increasing emphasis on cost containment measures in the United States and other countries 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.

***Other Healthcare Laws and Compliance Requirements***

If we obtain regulatory approval for any of our product candidates, we may be subject to various federal and state laws targeting fraud and abuse in the healthcare industry. These laws may impact, among other things, our proposed sales, marketing and education programs. In addition, we may be subject to patient privacy regulation by both the federal government and the states in which we conduct our business. The laws that may affect our ability to operate include:

- the federal Anti-Kickback Statute, which prohibits, among other things, persons and entities from knowingly and willfully soliciting, receiving, offering or paying remuneration, directly or indirectly, to induce, or in return for, the purchase or recommendation of an item or service reimbursable under a federal healthcare program, such as the Medicare and Medicaid programs;
- federal civil and criminal false claims laws and civil monetary penalty laws, including the civil False Claims Act, which prohibit, among other things, individuals or entities from knowingly presenting, or causing to be presented, claims for payment from Medicare, Medicaid, or other third-party payors that are false or fraudulent;
- the federal Health Insurance Portability and Accountability Act of 1996 (HIPAA), which created new federal criminal statutes that prohibit executing a scheme to defraud any healthcare benefit program and making false statements relating to healthcare matters;
- the federal transparency laws, including the provision of the ACA referred to as the federal Physician Payments Sunshine Act, that requires certain drug and biologics manufacturers to disclose payments and other transfers of value provided to physicians (defined to include doctors, dentists, optometrists, podiatrists, and chiropractors), certain other healthcare professionals (such as physician assistants and nurse practitioners), and teaching hospitals and ownership interests of physicians and their immediate family members;
- HIPAA, as amended by the Health Information Technology for Economic and Clinical Health Act and its implementing regulations, which imposes certain requirements on HIPAA covered entities, their business associates and their covered subcontractors relating to the privacy, security and transmission of individually identifiable health information; and
- state law equivalents of each of the above federal laws, such as anti-kickback and false claims laws that may apply to items or services reimbursed by any third-party payor, including commercial insurers, and state laws governing transparency, marketing and drug pricing reporting, and the privacy and security of health information in certain circumstances, many of which differ from each other in significant ways and may not have the same effect, thus complicating compliance efforts.

The ACA broadened the reach of the fraud and abuse laws by, among other things, amending the intent requirement of the federal Anti-Kickback Statute and certain other criminal healthcare fraud statutes. Pursuant to the statutory amendment, a person or entity no longer needs to have actual knowledge of this statute or specific intent to violate it in order to have committed a violation. In addition, 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 civil False Claims Act or the civil monetary penalties statute. Many states have adopted laws similar to the federal Anti-Kickback Statute, some of which apply to the referral of patients for healthcare items or services reimbursed by any source, not only the Medicare and Medicaid programs.

We are also subject to the U.S. Foreign Corrupt Practices Act (FCPA), which prohibits improper payments or offers of payments to foreign governments and their officials for the purpose of obtaining or retaining business. Safeguards we implement to discourage improper payments or offers of payments by our employees, consultants, and others may be ineffective, and violations of the FCPA and similar laws may result in severe criminal or civil sanctions, or other liabilities or proceedings against us, any of which would likely harm our reputation, business, financial condition and result of operations.

If our operations are found to be in violation of any of the laws described above or any other governmental regulations that apply to us, we may be subject to penalties, including significant administrative, civil and criminal penalties, exclusion from participation in government healthcare programs, such as Medicare and Medicaid and imprisonment, disgorgement, damages, fines, additional reporting requirements and regulatory oversight and the curtailment or restructuring of our operations, any of which could adversely affect our ability to operate our business and our results of operations.

**Employees and Human Capital Resources**

As of December 31, 2023, we had 59 employees, 56 of which were full-time employees. Of our full-time employees, 36 serve in roles related to research and development, clinical, manufacturing and regulatory affairs, and 20 serve in general and administrative capacities. As of December 31, 2023, all of our employees were based in the United States. We also engage temporary consultants and contractors. All of our employees are "at–will," which means that each employee can terminate his or her relationship with us and we can terminate our relationship with him or her, at any time. None of our employees are represented by a labor union or covered by collective bargaining agreements. We consider our relationship with our employees to be good.

We compete in the highly competitive biotechnology industry. Attracting, developing and retaining talented employees is crucial to executing our strategy and our ability to compete effectively. Our ability to recruit and retain such talent depends on several factors, including compensation and benefits, talent development and career opportunities, and work environment. To that end, we invest in our employees to be an employer of choice.

Our Code of Business Conduct and Ethics (Code of Conduct) ensures that our core values of respect, integrity, collaboration, innovation, trust, and excellence are applied throughout our operations. Our Code of Conduct serves as a critical tool to help all of us recognize and report unethical conduct, while preserving and nurturing our culture of honesty and accountability.

The physical health, financial wellbeing, work-life balance and mental health of our employees is vital to our success. Our environmental, health and safety team stays abreast of local, regional and global concerns and trends and ensures safety procedures are in place to mitigate workplace injuries and safety risks. Our employees are required to complete training in various safety procedures for the laboratories and manufacturing facilities and specialized safety training based on particular job duties. Our Designated Safety Officers and response teams oversee safety-related initiatives and a safety committee that provides input on safety procedures, practices, and policies. Our employees are required to wear personal protective equipment relevant for their particular job duties. Occupational injuries at our facilities are extremely low and are always investigated to determine if any environmental or other changes need to be implemented.

**Financial Information about Segments**

We operate in a single accounting segment. Refer to Note 1 to our consolidated financial statements included elsewhere in this Annual Report.

**Corporate Information**

We were incorporated under the laws of the State of Delaware in September 2005. Our principal executive office is located at 10240 Sorrento Valley Road, Suite 300, San Diego, California 92121, and our telephone number is (858) 731-8389. Our website address is www.atyrpharma.com.

You are advised to read this Annual Report in conjunction with other reports and documents that we file from time to time with the SEC. Our Annual Reports on Form 10-K, Quarterly Reports on Form 10-Q, Current Reports on Form 8-K, and amendments to these reports filed or furnished pursuant to Section 13(a) or 15(d) of the Exchange Act, are available free of charge on our website as soon as reasonably practicable after such reports and amendments are electronically filed with, or furnished to, the SEC. You may obtain copies of these reports directly from us or from the SEC. In addition, the SEC maintains information for electronic filers (including aTyr Pharma, Inc.) at its website at www.sec.gov. We also make available copies of our news releases and other financial information and updates with respect to our business on our website. We do not incorporate the information on or accessible through our website into this Annual Report, and you should not consider any information on, or that can be accessed through, our website as part of this Annual Report.

**Item 1A. Risk Factors**

*You should carefully consider the following risk factors, as well as the other information in this Annual Report on Form 10-K (Annual Report) and in our other public filings with the SEC. The occurrence of any of these risks could harm our business, financial condition, results of operations and/or growth prospects or cause our actual results to differ materially from those contained in forward-looking statements we have made in this Annual Report and those we may make from time to time. You should consider all of the risk factors described in our public filings when evaluating our business.*

**Risks related to the discovery, development and regulation of our product candidates**

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

Before obtaining marketing approval from regulatory authorities for the sale of our product candidates, we must conduct extensive clinical trials to demonstrate the safety and efficacy of the product candidates in humans. Clinical trials are expensive, time-consuming, often delayed and uncertain as to outcome. We cannot guarantee that our ongoing or planned clinical trials will be initiated or conducted as planned or completed on schedule, if at all. We cannot assure you that our product candidates will not be subject to new clinical holds or significant delay in the future. For example, we may experience delays in site initiation and patient enrollment, failures to comply with study protocols, delays in the manufacture of study drug for clinical testing and other difficulties in starting or completing our Phase 3 randomized, double-blind, placebo-controlled clinical trial to evaluate the efficacy and safety of efzofitimod in patients with pulmonary sarcoidosis (the EFZO-FIT study) and our Phase 2 study in systemic sclerosis (SSc also known as scleroderma) associated-ILD (SSc-ILD) (the EFZO-CONNECT study) or future clinical trials. Any inability to initiate or complete clinical trials of our product candidates in the United States, as a result of clinical holds or otherwise, would delay our clinical development plans, may require us to incur additional clinical development costs and could impair our ability to obtain U.S. regulatory approval for such product candidates.

A failure of one or more clinical trials can occur at any stage of testing, and our clinical trials may not be successful. Events that may prevent successful or timely completion of clinical development include, but are not limited to:

- our inability to generate sufficient preclinical, toxicology, or other *in vivo* or *in vitro* data to support the initiation of human clinical trials, including clinical trials of certain dosages;
- delays in reaching consensus with regulatory agencies on trial design, including the endpoints for our global pivotal Phase 3 study of efzofitimod in patients with pulmonary sarcoidosis (the EFZO-FIT study), and prioritization of outcome measurements that would best support the evaluation of efzofitimod's efficacy;
- delays in reaching agreement on acceptable terms with prospective clinical contract research organizations (CROs) and clinical trial sites, including any delays resulting from changes in CROs;
- delays in obtaining required institutional review board or Ethics Committee approval at each clinical trial site;
- delays in recruiting suitable patients to participate in our clinical trials, or delays that may result if the number of patients required for a clinical trial is larger than we anticipate;
- imposition of a clinical hold by regulatory agencies, which may occur at any time before or during a clinical trial, including after our submission of data to these agencies or an inspection of our clinical trial operations or trial sites;
- failure by our CROs, investigators, other third parties or us to adhere to clinical trial requirements;
- failure to perform in accordance with the good clinical practices (GCPs) of the U.S. Food and Drug Administration (FDA) or applicable regulatory requirements in other countries;
- delays in the testing, validation, manufacturing and delivery of our product candidates to the clinical sites;
- delays in having patients complete participation in a trial or return for post-treatment follow-up;
- disagreements with regulators regarding our interpretation of data from preclinical studies or clinical trials;
- occurrence of adverse events associated with a product candidate that are viewed to outweigh its potential benefits; or
- changes in regulatory requirements and guidance that require amending or submitting new clinical protocols.

Any delay in or inability to successfully complete preclinical and clinical development (including any delays resulting from any changes in a CRO) could result in additional costs to us and impair our ability to generate revenue. In addition, if we make manufacturing or formulation changes to our product candidates (including our technology transfer to another contract development manufacturing organization (CDMO) for bulk drug substance and production capacity changes for efzofitimod), we will need to conduct additional

comparability studies to bridge our modified product candidates to earlier versions, and the data generated from these comparability studies will need to be reviewed and accepted by the FDA or other regulatory authorities.

If the results of our clinical trials are perceived to be negative or inconclusive, or if there are safety concerns or adverse events associated with our product candidates, we may be required to perform additional clinical trials to support approval or be subject to additional post-marketing testing requirements; be delayed in obtaining marketing approval for our product candidates, if at all; obtain approval for indications or patient populations that are not as broad as intended or desired; obtain approval with labeling that includes significant use or distribution restrictions or safety warnings; be subject to changes in the way the product is manufactured or administered; have regulatory authorities withdraw their approval of the product or impose restrictions on its distribution in the form of a modified risk evaluation and mitigation strategy; be subject to litigation; or experience damage to our reputation.

To date, the safety and efficacy of efzofitimod has only been studied in a limited number of humans. Accordingly, efzofitimod and any future product candidates could potentially cause unexpected adverse events. In addition, the inclusion of critically ill patients in our clinical trials may result in deaths or other adverse medical events due to the natural progression of the disease.

Further, if patients drop out of our ongoing or future clinical trials, miss scheduled doses or follow-up visits or otherwise fail to follow trial protocols, or if our clinical trials are otherwise disrupted due to global geopolitical tension, armed conflicts, potential future health pandemics or other adverse macroeconomic and geopolitical events, the integrity of data from our clinical trials may be compromised or not accepted by the FDA or other regulatory authorities, which would represent a significant setback for the applicable program. In addition, the COVID-19 pandemic previously impacted clinical trials broadly, including our completed efzofitimod Phase 1b/2a trial in patients with pulmonary sarcoidosis, where many sites stopped enrollment and patients chose not to enroll or continue participating in the trial due to the impact of COVID-19. While we completed the clinical trial, the availability of results from the Phase 1b/2a clinical trial was delayed until September 2021.

***If we are unable to successfully complete or otherwise advance clinical development, obtain regulatory or marketing approval for, or successfully commercialize our therapeutic product candidates, including efzofitimod, or experience significant delays in doing so, our business will be materially harmed.***

To date, we have expended significant time, resources and effort on the discovery and development of product candidates related to the extracellular proteins derived from the histidyl tRNA synthetase (HARS) family, including conducting preclinical studies and clinical trials. We have not yet completed any evaluation of our product candidates in human clinical trials designed to demonstrate efficacy to the satisfaction of the FDA. Before we can market or sell our therapeutic candidates in the United States or foreign jurisdictions, we will need to commence and complete additional clinical trials (including our EFZO-CONNECT study) and larger, pivotal trials (like the EFZO-FIT study), manage clinical and manufacturing activities, obtain necessary regulatory approvals from the FDA in the United States and from similar regulatory authorities in other jurisdictions, obtain adequate clinical and commercial manufacturing supplies, build commercial capabilities, which may include entering into a marketing collaboration with a third party, and in some jurisdictions, obtain reimbursement authorization, among other things. We cannot assure you that we will be able to successfully complete the necessary clinical trials, obtain regulatory approvals, secure an adequate commercial supply for, or otherwise successfully commercialize our therapeutic candidates. If we do not receive regulatory approvals for our product candidates, and even if we do obtain regulatory approvals, we may never generate significant revenues, if any, from commercial sales. If we fail to successfully commercialize our therapeutic candidates, we may be unable to generate sufficient revenues to sustain and grow our company, and our business, prospects, financial condition and results of operations will be adversely affected.

***There is no established FDA regulatory pathway for approval of a drug in pulmonary sarcoidosis. As a result, the EFZO-FIT study, even if successful, may not be sufficient to support FDA approval, which would materially and adversely harm our business.***

During the third quarter of 2022, we initiated the EFZO-FIT study. The only FDA-approved therapies for the treatment of sarcoidosis are glucocorticoids which were approved by the FDA in the 1950s, prior to current regulatory standards. As such, the most appropriate efficacy endpoints to demonstrate clinically meaningful treatment effects have not been established. In this instance, without regulatory precedent for established endpoints, the FDA has not endorsed a specific means for measurement of steroid reduction. Therefore, we are measuring steroid reduction in multiple ways in an effort to support an approval. Our rationale for selecting endpoints for the EFZO-FIT study is based on the anticipated effects of efzofitimod in pulmonary sarcoidosis consistent with the results of our completed Phase 1b/2a study in patients with pulmonary sarcoidosis. The FDA has highlighted the risk of proceeding with a larger study of longer duration based on our limited Phase 1b/2a data, and our inability to replicate the findings in our Phase 1b/2a study would not support FDA approval and will adversely affect our business, prospects, financial condition and results of operations.

In addition, the FDA has substantial discretion in the approval process and may refuse to accept any application or decide that our data are insufficient for approval and require additional preclinical, clinical or other trials, which would be costly and significantly delay the potential for regulatory approval. In particular, even if we were to receive positive data from the EFZO-FIT study, the FDA may determine that the data is not compelling enough for approval. The FDA may also require a panel of experts, referred to as an

Advisory Committee, to deliberate on the adequacy of the safety and efficacy data to support approval. The opinion of the Advisory Committee, although not binding, may have a significant impact on our ability to obtain approval of efzofitimod based on the completed clinical trials.

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

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

In addition, we may report interim analyses of only certain endpoints rather than all endpoints. Interim data from clinical trials that we may complete are subject to the risk that one or more of the clinical outcomes may materially change as patient enrollment continues and more patient data become available. Adverse differences between preliminary or interim data and final data could significantly harm our business prospects. Further, disclosure of interim data by us or by our competitors could result in volatility in the price of our common stock.

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

***We have encountered and may continue to encounter delays and difficulties enrolling patients in our clinical trials for a variety of reasons, including the limited number of patients who have the diseases for which certain of our product candidates are being studied, which could delay or halt the clinical development of our product candidates.***

Identifying and qualifying patients to participate in clinical trials for our product candidates is critical to our success. Certain of the conditions for which we may elect to evaluate our product candidates may be rare diseases with limited patient pools from which to draw for clinical trials.

For example, we are conducting the EFZO-FIT study in patients with pulmonary sarcoidosis. While estimates of pulmonary sarcoidosis prevalence vary, we estimate that pulmonary sarcoidosis affects an estimated 200,000 patients in the United States. Of that population, however, we estimate that approximately 70% experience symptomatic disease such that our targeted population is smaller. The eligibility criteria for any of our clinical trials may further limit the pool of available participants in our clinical trials. For example, if patients have been previously prescribed certain other medications to treat pulmonary sarcoidosis or if they have not been on steroids for a certain period of time, they may not be eligible to participate in the EFZO-FIT study, thus further reducing our patient pool. We may be unable to identify and enroll a sufficient number of patients with the disease in question and who meet the eligibility criteria for, and are willing to participate in, the clinical trials. Once enrolled, patients may decide or be required to discontinue from the clinical trial due to inconvenience, burden of trial requirements, adverse events associated with efzofitimod, limitations required by trial protocols or other reasons. Additionally, we are conducting the EFZO-CONNECT study in patients with SSc-ILD. It is estimated that approximately 100,000 people in the United States are affected by SSc and up to 80% may develop interstitial lung disease (ILD).

Our ability to identify, recruit, enroll and maintain a sufficient number of patients, or those with required or desired characteristics to achieve diversity in our clinical trials in a timely manner may also be affected by other factors, including, but not limited to:

- proximity and availability of clinical trial sites for patients;
- severity of the disease under investigation;

- design of the study protocol and the burdens to patients of compliance with our study protocol;
- perceived risks and benefits of the product candidate under study;
- availability of competing therapies and clinical trials for the patient populations and indications under study;
- efforts to facilitate timely enrollment in clinical trials;
- patient referral practices of physicians; and
- ability to monitor patients adequately during and after treatment.

We plan to seek initial marketing approval in the United States. We may not be able to initiate or continue clinical trials if we cannot enroll a sufficient number of eligible patients to participate in the clinical trials required by the FDA or other regulatory agencies. Our ability to successfully initiate, enroll and complete a clinical trial in any foreign country is subject to numerous risks unique to conducting business in foreign countries, including, but not limited to:

- difficulty in establishing or managing relationships with or changes in CROs and physicians;
- different requirements and standards for the conduct of clinical trials;
- our inability to locate qualified local consultants, physicians and partners; and
- the potential burden of complying with a variety of foreign laws, medical standards and regulatory requirements, including the regulation of biotechnology products and treatment.

Additionally, if patients are unwilling to participate in our clinical trials because of negative publicity from adverse events in our clinical trials or in the biotechnology or protein therapeutics industries or for other reasons, including competitive clinical trials for similar patient populations, the timeline for recruiting patients, conducting studies and obtaining regulatory approval of potential products may be delayed. These delays could result in increased costs, delays in advancing our product development or termination of our clinical trials altogether. If we have difficulty enrolling and maintaining a sufficient number of patients to conduct our clinical trials as planned for any reason, we may need to delay, limit or terminate clinical trials, any of which would have an adverse effect on our business, prospects, financial condition and results of operations.

Furthermore, clinical trial delays could also shorten any periods during which we may have the exclusive right to commercialize our product candidates or allow our competitors to bring products to market before we do, which could impair our ability to obtain orphan exclusivity and successfully commercialize our product candidates and may have an adverse effect on our business, financial condition and results of operations.

***Our current product candidates and any other product candidates that we may develop from our discovery platform represent novel therapeutic approaches, which may cause significant delays or may not result in any commercially viable drugs.***

We have concentrated the bulk of our research and development efforts to date on studying extracellular functions of tRNA synthetase biology, a newly discovered area of biology. Our future success is highly dependent on the successful development of product candidates based on this new area of biology, including efzofitimod, and additional product candidates arising from proteins derived from tRNA synthetases, including aspartyl-tRNA synthetase (DARS) and aminoacyl-tRNA synthetase (AARS). ATYR0101, a fusion protein derived from a domain of DARS, and ATYR0750, a fusion protein derived from a domain of AARS, are product candidates from our tRNA synthetase biology program that we are continuing to advance in preclinical studies. Extracellular tRNA synthetase-based biology represents a novel approach to drug discovery and development, and to our knowledge, no drugs have been developed using, or based upon, this approach. Despite the successful development of other naturally occurring proteins, such as erythropoietin and insulin, as therapeutics, proteins derived from HARS, AARS or DARS families and from other tRNA synthetase pathways represent a novel class of protein therapeutics, and our development of these therapeutics is based on our new understanding of human physiology. In particular, the mechanism of action of tRNA synthetases has not been studied extensively, nor has the safety of this class of protein therapeutics been evaluated extensively in humans. The therapeutic product candidates that we elect to develop may not have the physiological functions that we currently ascribe to them, may have limited or no therapeutic applications, or may present safety problems of which we are not yet aware. We cannot be sure that our discovery platform will yield therapeutic product candidates that are safe, effective, approvable by regulatory authorities, manufacturable, scalable, or profitable.

Because our work represents a new therapeutic approach, developing and commercializing our product candidates, including efzofitimod, subjects us to a number of challenges, including:

- defining indications within our targeted diseases and clinical endpoints within each indication that are appropriate to support regulatory approval, including with respect to the EFZO-FIT study and the EFZO-CONNECT study, and prioritization of outcome measurements that would best support the evaluation of efzofitimod's efficacy;

• obtaining regulatory approval from the FDA and other regulatory authorities that have little or no experience with the development of extracellular tRNA synthetase-based therapeutics;

• educating medical personnel regarding the potential side effect profile of each of our product candidates, such as the potential for the development of antibodies against our purified protein therapeutics;

• developing processes for the safe administration of these product candidates, including long-term follow-up for all patients who receive our product candidates;

• sourcing clinical and, if approved, commercial supplies for the materials used to manufacture and process our product candidates;

• developing a manufacturing process and distribution network that ensures consistent manufacture of our product candidates in compliance with current good manufacturing practices (cGMPs) and related requirements, with a cost of goods that allows for an attractive return on investment;

• obtaining and maintaining third-party coverage and adequate reimbursement of our product candidates;

• establishing sales and marketing capabilities after obtaining any regulatory approval to gain market acceptance; and

• developing therapeutics for diseases or indications beyond those addressed by our current product candidates.

Moreover, public perception of safety issues, including adoption of new therapeutics or novel approaches to treatment, may adversely influence the willingness of subjects to participate in clinical trials, or if approved, of physicians to adopt and prescribe novel therapeutics. Physicians, hospitals and third-party payors often are slow to adopt new products, technologies and treatment practices. Physicians may decide the therapy is too complex or unproven to adopt and may choose not to administer the therapy. Based on these and other factors, healthcare providers and payors may decide that the benefits of any therapeutic candidates for which we receive regulatory approval do not or will not outweigh its costs. Any inability to successfully develop commercially viable drugs would have an adverse impact on our business, prospects, financial condition and results of operations.

***Data generated in our preclinical studies and patient sample data relating to the immunomodulatory domain of HARS, including efzofitimod, may not be predictive or indicative of the immunomodulatory activity or therapeutic effects, if any, of our product candidates in patients.***

Our scientists discovered the activity of the immunomodulatory domain of HARS, including efzofitimod, using *in vitro* and *in vivo* screening systems designed to test potential immunomodulatory activity in animal models of immune activity or inflammation. Translational medicine, or the application of basic scientific findings to develop therapeutics that promote human health, is subject to a number of inherent risks. In particular, scientific hypotheses formed from preclinical observations may prove to be incorrect, and the data generated in animal models or observed in limited patient populations may be of limited value, and may not be applicable in clinical trials conducted under the controlled conditions required by applicable regulatory requirements and our protocols. For example, we have not extensively studied the activity of efzofitimod in patients with ILD.

Our classification of diseases based on the existence of excessive immune cell activation or lack thereof and our hypothesis that these represent potential indications for our product candidates may not prove to be therapeutically relevant. Accordingly, the conclusions that we have drawn from animal studies and patient sample data regarding the potential immunomodulatory activity of efzofitimod may not be substantiated in other animal models or in clinical trials. Further, based on the discovery of the involvement of NRP2 in the mechanism of action of efzofitimod, we are still expanding our knowledge of the role of the NRP2 pathway in regulating immune responses. Although we were able to establish clinical proof-of-concept for efzofitimod in our Phase 1b/2a clinical trial in patients with pulmonary sarcoidosis, this may not be validated in other clinical trials. Any failure to demonstrate in controlled clinical trials the requisite safety and efficacy of our product candidates will adversely affect our business, prospects, financial condition and results of operations.

***We have previously conducted and we or our third party collaborators may conduct additional clinical trials of efzofitimod outside of the United States. The FDA, however, may not accept data from such trials, in which case our development plans will be delayed, which could materially harm our business.***

In June 2018, we completed a Phase 1 clinical trial of efzofitimod in healthy subjects in Australia. This randomized, double-blind, placebo-controlled study investigated the safety, tolerability, immunogenicity, and pharmacokinetics (PK) of intravenous efzofitimod in 36 healthy volunteers. In addition, we or our third party collaborators may choose to conduct additional clinical trials for efzofitimod in countries outside the United States, subject to applicable regulatory approval. For example, our partner, Kyorin Pharmaceutical Co., Ltd. (Kyorin), conducted and funded an efzofitimod Phase 1 clinical trial in 32 healthy Japanese male volunteers

and is participating in the EZFO-FIT study. We are enrolling subjects in the EZFO-FIT study in centers in the United States, Europe and Brazil and Kyorin is enrolling subjects in the EZFO-FIT study in centers in Japan.

Although the FDA may accept data from clinical trials conducted outside the United States, acceptance of such study data is generally subject to certain conditions. For example, 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 in the U.S. population and U.S. medical practice; and (ii) the clinical trials were performed by clinical investigators of recognized competence and pursuant to GCP regulations. Additionally, the FDA's clinical trial requirements, including sufficient size of patient populations and statistical powering, must be met. In addition, when studies are conducted only at sites outside of the United States, the FDA generally does not provide advance comment on the clinical protocols for the studies, and therefore there is an additional risk that the FDA could determine that the study design or protocol for a non-U.S. clinical trial was inadequate, which would likely require us to conduct additional clinical trials, in which case our development plans will be delayed, which could materially harm our business.

Conducting clinical trials outside the United States also exposes us to additional risks, including risks associated with:

- additional foreign regulatory requirements;
- foreign exchange fluctuations;
- compliance with foreign manufacturing, customs, shipment and storage requirements;
- cultural differences in medical practice and clinical research;
- evolving global geopolitical tension, armed conflicts and macroeconomic developments, ; and
- diminished protection of intellectual property in some countries.

Further, the integrity of data from any clinical trials conducted outside of the United States may not be acceptable to the FDA.

***Our therapeutic product candidates may cause undesirable side effects or have other properties that could delay or prevent their regulatory approval, limit the commercial profile of an approved label, or result in significant negative consequences following marketing approval, if any.***

Undesirable side effects caused by our product candidates, or safety, tolerability or toxicity issues that may occur in our preclinical studies, clinical trials or in the future, could cause us or regulatory authorities to interrupt, restrict, delay, or halt clinical trials and could result in a more restrictive label or the delay or denial of regulatory approval by the FDA or other comparable foreign authorities.

Generalized infusion related reactions (IRRs) and other complications or side effects could harm further development and/or commercialization of our product candidates, including efzofitimod. Additionally, our product candidates are designed to be administered by intravenous injection, which may cause side effects, including acute immune responses and injection site reactions. The risk of adverse immune responses remains a significant concern for protein therapeutics, and we cannot assure you that these or other risks will not occur in any of our clinical trials our product candidates. There is also a risk of delayed adverse events as a result of long-term exposure to protein therapeutics that must be administered repeatedly for the management of chronic conditions, such as the development of antibodies, which may occur over time. If any such adverse events occur, which may include the development of a negative autoimmune response from antibodies or the occurrence of IRRs associated with antibodies, further advancement of our clinical trials could be halted or delayed, which would have a material adverse effect on our business, prospects, financial condition and results of operations.

If one or more of our product candidates receives marketing approval, and we or others later identify undesirable side effects or other safety concerns caused by such products, a number of potentially significant negative consequences could result.

Any of these events could prevent us from achieving or maintaining market acceptance of the particular product candidate, if approved, and could significantly harm our business, prospects, financial condition and results of operations.

***We may not be successful in our efforts to identify or discover additional product candidates.***

A key element of our strategy is to expand applications of efzofitimod to additional immune-mediated diseases and leverage our discovery platform to identify the therapeutic potential of extracellular proteins derived from tRNA synthetases to help identify or discover additional product candidates. A significant portion of the research that we are conducting involves new compounds and drug discovery methods, including our proprietary technology. Our drug discovery activities using our proprietary technology may not be

successful in identifying product candidates that are useful in treating diseases. Our research programs may initially show promise in identifying potential product candidates, yet fail to yield product candidates for clinical development for a number of reasons, including:

- the research methodology used may not be successful in identifying appropriate potential product candidates; or
- potential product candidates may, on further study, be shown to have harmful side effects or other characteristics that indicate that they are unlikely to be product candidates that will receive marketing approval and achieve market acceptance.

Research programs to identify new product candidates require substantial technical, financial and human resources. We may choose to focus our efforts and resources on a potential product candidate that ultimately proves to be unsuccessful. If we are unable to identify suitable product candidates for preclinical and clinical development and regulatory approval, we will not be able to generate product revenues, which would have an adverse impact on our business, prospects, financial condition and results of operations.

***We may face manufacturing stoppages and other challenges associated with the clinical or commercial manufacture of our product candidates.***

All entities involved in the preparation of therapeutics for clinical trials or commercial sale, including our existing CDMOs for our product candidates, are subject to extensive regulation. Components of a finished therapeutic product approved for commercial sale or use in late-stage clinical trials must be manufactured in accordance with cGMPs. These regulations govern manufacturing processes and procedures (including record keeping) and the implementation and operation of quality systems to control and assure the quality of investigational products and products approved for sale. Poor control of production processes can lead to the introduction of contaminants or to inadvertent changes in the properties or stability of our product candidates that may not be detectable in final product testing. We or our CDMOs must supply all necessary documentation in support of a biologics license application (BLA) on a timely basis and must adhere to the FDA's Good Laboratory Practices and cGMP regulations enforced by the FDA through its facilities inspection program. The facilities and quality systems of our CDMOs and other CROs must pass a pre-approval inspection for compliance with applicable regulations as a condition of regulatory approval of our product candidates. If these facilities do not pass a pre-approval plant inspection, FDA approval of the products will not be granted. If anything were to prevent the FDA or other regulatory authorities from conducting their regular inspections, it could impact the ability of our CDMOs to provide us with product for clinical trials.

The regulatory authorities also may, at any time following approval of a product for sale, audit the facilities in which the product is manufactured. If any such inspection or audit of our facilities or those of our CDMOs and CROs identifies a failure to comply with applicable regulations or if a violation of our product specifications or applicable regulations occurs independently of such an inspection or audit, we or the relevant regulatory authority may require remedial measures that may be costly or time-consuming for us or a third party to implement and that may include the temporary or permanent suspension of a clinical trial or commercial sales or the temporary or permanent closure of a facility. Any such remedial measures imposed upon us or third parties with whom we contract could materially harm our business.

If we or any of our CDMOs and CROs fail to maintain regulatory compliance, the FDA can impose regulatory sanctions including, among other things, refusal to approve a pending application for a new biologic product, or revocation of a pre-existing approval. Additionally, if supply from one approved manufacturer is interrupted, there could be a significant disruption in clinical or commercial supply. An alternative manufacturer would need to be qualified through a BLA supplement which could result in further delay. The regulatory agencies may also require additional studies if a new manufacturer is relied upon for commercial production. Switching manufacturers may involve substantial costs and is likely to result in a delay in our desired clinical and commercial timelines.

In addition, the manufacture of our product candidates presents challenges associated with biologics production, including the inherent instability of larger, more complex molecules and the need to ensure uniformity of the drug substance produced in different facilities or across different batches. The process of manufacturing biologics is extremely susceptible to product loss due to contamination, equipment failure or improper installation or operation of equipment, or vendor or operator error. Even minor deviations from normal manufacturing and distribution processes for any of our product candidates could result in reduced production yields, product defects, and other supply disruptions. Furthermore, although tRNA synthetases represent a class of proteins that may share immunomodulatory properties in various physiological pathways, each tRNA synthetase has a different structure and may have unique manufacturing requirements that are not applicable across the entire class. For example, fusion proteins, such as efzofitimod, include an additional antibody domain to improve PK characteristics, and may therefore require a more complex and time-consuming manufacturing process than other tRNA synthetase-based therapeutic candidates. Currently, we are producing our efzofitimod molecule in *E.coli*. The manufacturing processes for one of our product candidates may not be readily adaptable to other product candidates that we develop, and we may need to engage multiple third-party manufacturers to produce our product candidates. For example, we engaged an additional CDMO to manufacture efzofitimod and completed a technology transfer and validation process before the new CDMO was able to produce additional bulk drug substance. Any adverse developments affecting manufacturing operations for our product candidates may result in shipment delays, inventory shortages, lot failures, withdrawals or recalls or other interruptions in the supply of

our drug substance and drug product which could delay the development of our product candidates. We may also have to write off inventory, incur other charges and expenses for supply of drug product that fails to meet specifications or expires, undertake costly remediation efforts, or seek more costly manufacturing alternatives. Any manufacturing stoppage or delay, or any inability to consistently manufacture adequate supplies of our product candidates for our clinical trials or on a commercial scale will harm our business, prospects, financial condition and results of operations.

***Even if we complete the necessary preclinical studies and clinical trials, we cannot predict when or if we will obtain regulatory approval to commercialize a product candidate, and the scope of any approval may be narrower than we expect.***

We cannot commercialize a product until the appropriate regulatory authorities have reviewed and approved the product candidate. Even if our product candidates demonstrate safety and efficacy in clinical trials, the regulatory agencies may not complete their review processes in a timely manner, or we may not be able to obtain regulatory approval.

Additional delays may result if an FDA advisory committee or regulatory authority recommends non-approval or restrictions on approval. In addition, we may experience delays or rejections based upon additional government regulation from future legislation or administrative action, or changes in regulatory agency policy during the period of product development, clinical trials and the review process. Regulatory agencies also may approve a product candidate for fewer or more limited indications than requested, may impose restrictions on dosing or may grant approval subject to the performance of post-marketing studies. In addition, regulatory agencies may not approve the labeling claims that are necessary or desirable for the successful commercialization of our product candidates.

***Although we have obtained orphan drug designation for efzofitimod for the treatment of sarcoidosis and systemic sclerosis in the United States and for the treatment of sarcoidosis in the European Union (EU) we may not receive orphan drug designation for efzofitimod in other jurisdictions or for other indications that we may pursue, or for any other product candidates we may develop under any new applications for orphan drug designation that we may submit, and any orphan drug designations that we have received or may receive may not confer marketing exclusivity or other expected commercial benefits.***

The FDA granted orphan drug designation to efzofitimod for the treatment of sarcoidosis in January 2022 and SSc in April 2022. The European Commission, on the basis of the opinion of the European Medicines Agency (EMA) Committee for Orphan Medicinal Products (COMP) granted orphan drug designation to efzofitimod for the treatment of sarcoidosis in January 2023 and for the treatment of SSc in June 2023. We may apply for orphan drug designation for efzofitimod for other indications and product candidates in the United States and the EU.

Under the Orphan Drug Act, the FDA may designate a drug or biologic product as an orphan drug if it is intended to treat a rare disease or condition, defined as a patient population of fewer than 200,000 in the United States, 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. In the EU, the EMA's COMP grants orphan drug designation to promote the development of products that are intended for the diagnosis, prevention, or treatment of a life-threatening or chronically debilitating condition affecting not more than five in 10,000 persons in the EU. Additionally, designation is granted for products intended for the diagnosis, prevention, or treatment of a life-threatening, seriously debilitating or serious and chronic condition when, without incentives, it is unlikely that sales of the drug in the EU would be sufficient to justify the necessary investment in developing the drug or biological product or where there is no satisfactory method of diagnosis, prevention, or treatment, or, if such a method exists, the medicine must be of significant benefit to those affected by the condition.

Orphan drug status confers up to ten years of marketing exclusivity in Europe, and up to seven years of marketing exclusivity in the United States, for a particular product in a specified indication. Obtaining an orphan drug designation can be difficult and we cannot assure you that we will be able to obtain orphan drug designation in other jurisdictions or for other indications, or rely on orphan drug or similar designations to exclude other companies from manufacturing or selling products using the same principal mechanisms of action for the same indications that we pursue beyond these timeframes. Furthermore, marketing exclusivity in Europe can be reduced from ten years to six years if the initial designation criteria have significantly changed since the market authorization of the orphan product. Even if we are the first to obtain marketing authorization for an orphan drug indication, there are circumstances under which a competing product may be approved for the same indication during the period of marketing exclusivity, such as if the later product is shown to be clinically superior to the orphan product, or if the later product is deemed a different product than ours. Further, the marketing exclusivity would not prevent competitors from obtaining approval of the same product candidate as ours for indications other than those in which we have been granted orphan drug designation, or for the use of other types of products in the same indications as our orphan product.

***A breakthrough therapy or Fast Track designation by the FDA, including the Fast Track designation we received for efzofitimod, may not lead to expedited development or regulatory review or approval.***

In 2022, the FDA granted Fast Track designation to efzofitimod for the treatment of pulmonary sarcoidosis and for the treatment of SSc-ILD. We may seek, from time to time, breakthrough therapy or Fast Track designation for our product candidates. A breakthrough therapy designation is for a product candidate intended to treat a serious or life-threatening condition, and preliminary clinical evidence indicates that the product candidate may demonstrate substantial improvement on a clinically significant endpoint(s) over available therapies. A Fast Track designation is for a product candidate that treats a serious or life-threatening condition, and preclinical or clinical data demonstrate the potential to address an unmet medical need. The FDA has broad discretion whether or not to grant these designations. Accordingly, even if we believe a particular product candidate is eligible for breakthrough therapy or Fast Track designation, we cannot assure you that the FDA would decide to grant it. Even if we receive breakthrough therapy or Fast Track designation, we may not experience a faster development process, review or approval compared to conventional FDA procedures. The FDA may withdraw breakthrough therapy or Fast Track designation if it believes that the product no longer meets the qualifying criteria. In addition, the breakthrough therapy program is a relatively new program. As a result, we cannot be certain whether any of our product candidates can or will qualify for breakthrough therapy designation. Our business may be harmed if we are unable to avail ourselves of these or any other expedited development and regulatory pathways.

***Disruptions at the FDA and other government agencies caused by funding shortages or global health concerns could negatively impact our business.***

The ability of the FDA to review and approve proposed clinical trials or new products can be affected by a variety of factors, including government budget and funding levels, statutory, regulatory, and policy changes, the FDA's ability to hire and retain key personnel and accept the payment of user fees, and other events that may otherwise affect the FDA's ability to perform routine functions. Average review times at the agency have fluctuated in recent years as a result. In addition, government funding of other government agencies that fund research and development activities is subject to the political process, which is inherently fluid and unpredictable. Disruptions at the FDA and other agencies may also slow the time necessary for new product candidates to be reviewed and/or approved by necessary government agencies, which would adversely affect our business. For example, over the last several years, including for 35 days beginning on December 22, 2018, the U.S. government has shut down several times and certain regulatory agencies, such as the FDA, have had to furlough critical FDA employees and stop critical activities.

***Even if we obtain regulatory approval for a product candidate, our products will remain subject to regulatory scrutiny.***

Even if we obtain regulatory approval for a product candidate, such product will be subject to ongoing regulatory requirements for manufacturing, labeling, packaging, storage, advertising, promotion, sampling, record-keeping, conduct of post-marketing studies, adverse event reporting and submission of safety, efficacy, and other post-market information, including both federal and state requirements in the United States and requirements of comparable foreign regulatory authorities.

We and our CDMOs will be subject to continual review and inspections to assess compliance with cGMPs and adherence to commitments made in any BLA or marketing authorization application (MAA). Accordingly, we and others with whom we work will need to continue to expend time, money, and effort in all areas of regulatory compliance, including manufacturing, production, and quality control.

Any regulatory approvals that we receive for our product candidates may be subject to limitations on the approved indicated uses for which the product may be marketed or to the conditions of approval, or contain requirements for potentially costly post-marketing testing, including Phase 4 clinical trials, and surveillance to monitor the safety and efficacy of the product candidate. If new safety issues emerge, we may be required to change our labeling. Any new legislation addressing drug safety or efficacy issues could result in delays in product development or commercialization, or increased costs to assure compliance.

We will have to comply with requirements concerning advertising and promotion for our products. Violations, including actual or alleged promotion of our products for unapproved, or off-label, uses are subject to enforcement letters, inquiries and investigations, and civil and criminal sanctions. Any actual or alleged failure to comply with labeling and promotion requirements may have a negative impact on our business. In the United States, engaging in impermissible promotion of our products for off-label uses can also subject us to false claims litigation under federal and state statutes, which can lead to civil and criminal penalties and fines, agreements that would materially restrict the manner in which we promote or distribute our drug products and exclusion from Medicare, Medicaid and other federal and state healthcare programs. These false claims statutes include the federal False Claims Act, which allows any individual to bring a lawsuit against a pharmaceutical company on behalf of the federal government alleging submission of false or fraudulent claims, or causing to present such false or fraudulent claims, for payment by a federal program such as Medicare or Medicaid. If the government prevails in the lawsuit, the individual will share in any fines or settlement funds. If we do not lawfully promote our approved products, we may become subject to such litigation and, if we are not successful in defending against such actions, those actions could compromise our ability to become profitable.

The holder of an approved BLA or MAA must submit new or supplemental applications and obtain approval for certain changes to the approved product, product labeling, or manufacturing process. We could also be asked to conduct post-marketing clinical trials to verify the safety and efficacy of our products in general or in specific patient subsets. If original marketing approval were obtained through an accelerated approval pathway, we could be required to conduct a successful post-marketing clinical trial to confirm clinical benefit for our products. An unsuccessful post-marketing study or failure to complete such a trial could result in the withdrawal of marketing approval.

If a regulatory agency discovers previously unknown problems with a product, such as adverse events of unanticipated severity or frequency, or problems with the facility where the product is manufactured, or disagrees with the promotion, marketing or labeling of a product, such regulatory agency may impose restrictions on that product or us, including requiring withdrawal of the product from the market. If we fail to comply with applicable regulatory requirements, a regulatory agency or enforcement authority may, among other things:

- issue untitled or warning letters;
- impose civil or criminal penalties;
- suspend or withdraw regulatory approval;
- suspend any of our ongoing clinical trials;
- refuse to approve pending applications or supplements to approved applications submitted by us;
- impose restrictions on our operations, including closing our CDMOs' facilities; or
- seize or detain products, or require or request a product recall.

Any government investigation of alleged violations of law could require us to expend significant time and resources in response, and could generate negative publicity. Any failure to comply with ongoing regulatory requirements may significantly and adversely affect our ability to commercialize and generate revenue from our products. If regulatory sanctions are applied or if regulatory approval is withdrawn, the value of our company and our operating results will be adversely affected.

**Risks related to our financial condition and need for additional capital**

***We will need to raise additional capital or enter into strategic partnering relationships to fund our operations.***

The development of therapeutic product candidates is expensive, and we expect our research and development expenses to fluctuate. As of December 31, 2023, our cash, cash equivalents, restricted cash and available-for-sale investments were approximately $101.7 million. We believe that our current cash, cash equivalents, restricted cash and available-for-sale investments, will be sufficient to meet our material cash requirements for known contractual and other obligations for a period of at least one year from the date of this Annual Report. However, our operating plans may change as a result of many factors currently unknown to us, and we may need to seek additional funds sooner than planned, through equity or debt offerings, grant funding, collaborations, strategic partnerships and/or licensing arrangements. Our future funding requirements are difficult to forecast and will depend on many factors, including but not limited to:

- the type, number, scope progress, expansions, results, costs and timing of, our clinical trials and preclinical studies for our product candidates or other potential product candidates or indications which we are pursuing or may choose to pursue in the future, including changes in our CROs or CDMOs;
- the costs, timing and outcome of regulatory review of our product candidates;
- potential delays of our planned clinical trials of efzofitimod;
- cost increases related to the manufacturing of preclinical study and clinical trial materials, including cost increases related to technology transfers to additional CDMOs and any delays in the manufacturing of study drug;
- cost increases as a result of global geopolitical tension, armed conflicts, potential future health pandemics, liquidity concerns at, and failures of, banks and other financial institutions or other disruptions in the banking system or financing markets, higher interest rates and financial and credit market fluctuations, volatility in the capital markets, labor shortages, economic slowdowns, recessions or market corrections, inflation and monetary supply shifts and tightening of credit markets;
- the number and characteristics of product candidates that we pursue;
- the scope, progress, results and costs of preclinical development, and clinical trials for other product candidates;

- our ability to maintain existing and enter into new collaboration and licensing arrangements and the timing of any payments we may receive under such arrangements;
- the costs and timing of preparing, filing and prosecuting patent applications, maintaining and enforcing our intellectual property rights and defending any intellectual property-related claims; and
- the costs and timing of future commercialization activities, including product manufacturing, marketing, sales and distribution, for any of our product candidates for which we receive marketing approval.

In any event, we will require additional capital to complete additional clinical trials, to obtain regulatory approval for, and to commercialize, our product candidates, such as efzofitimod.

Raising funds in the current and future economic environment may present additional challenges. Even if we believe we have sufficient funds for our current or future operating plans, we may seek additional capital if market conditions are favorable or if we have specific strategic considerations. If we are unable to obtain funding on a timely basis, we may be required to significantly curtail, delay or discontinue one or more of our research or development programs or the commercialization of any product candidates, or we may be unable to expand our operations, maintain our current organization and employee base or otherwise capitalize on our business opportunities, as desired, which could materially affect our business, financial condition and results of operations.

The terms of any financing may adversely affect the holdings or the rights of our stockholders and the issuance of additional securities by us, or the possibility of such issuance, may cause the market price of our shares to decline. The sale of additional equity or convertible securities would cause dilution to all of our stockholders. The incurrence of indebtedness would result in fixed payment obligations and may require us to agree to certain restrictive covenants, such as limitations on our ability to incur debt, limitations on our ability to acquire, sell or license intellectual property rights and other operating restrictions that could adversely impact our ability to conduct our business. As a result of global geopolitical and macroeconomic conditions, liquidity concerns at, and failures of, banks and other financial institutions or other disruptions in the banking system or financing markets, higher interest rates and financial and credit market fluctuations, volatility in the capital markets, the global credit and financial markets have experienced volatility and disruptions, including severely diminished liquidity and credit availability, declines in consumer confidence, declines in economic growth, volatility in unemployment rates, inflation, higher interest rates and uncertainty about economic stability. If the equity and credit markets deteriorate, it may make any necessary debt or equity financing more difficult, more costly and more dilutive. In addition, any fundraising efforts may divert our management from their day-to-day activities, which may adversely affect our ability to develop and commercialize our product candidates.

Additionally, financial markets around the world experienced volatility following the invasion of Ukraine by Russia in February 2022. In response to the invasion, the United States, United Kingdom and European Union (EU), along with others, imposed significant new sanctions and export controls against Russia, Russian banks and certain Russian individuals and may implement additional sanctions or take further punitive actions in the future. The full economic and social impact of the sanctions imposed on Russia (as well as possible future punitive measures that may be implemented), as well as the counter measures imposed by Russia, in addition to the ongoing Ukraine-Russian conflict, which could conceivably expand into the surrounding region, remains uncertain; however, both the conflict and related sanctions have resulted and could continue to result in disruptions to trade, commerce, pricing stability, credit availability and/or supply chain continuity in both Europe and globally, and has introduced significant uncertainty into global markets. In particular, the ongoing Ukraine-Russia conflict has contributed to rapidly rising costs of living (driven largely by higher energy prices) in Europe and other advanced economies. Similarly, the conflict in the Middle East has resulted, and may continue to result, in disruptions to trade and supply chain continuity, and has increased supply chain costs, the full effects of which remains uncertain. Further, a weak or declining economy could strain our suppliers and manufacturers, possibly resulting in additional supply disruption for the production of efzofitimod. As a result, our business and results of operations may be adversely affected by the ongoing Ukraine-Russia conflict, particularly to the extent it escalates to involve additional countries, further economic sanctions or wider military conflict.

In addition, global economic and business activities continue to face widespread macroeconomic uncertainties, including liquidity concerns at, and failures of, banks and other financial institutions or other disruptions in the banking system or financing markets, higher interest rates and financial and credit market fluctuations, volatility in the capital markets, labor shortages, inflation and monetary supply shifts, and recession risks, which has resulted in further volatility in the U.S. and global financial markets and which has led to, and may continue to lead to, additional disruptions to trade, commerce, pricing stability, credit availability and supply chain continuity globally. The ultimate long-term impact of the ongoing Ukraine-Russia conflict, the conflict in the Middle East, and other evolving geopolitical and macroeconomic conditions on our business is uncertain, although we continue to actively monitor the impact of these factors on our results of operations, financial condition and cash flows. The extent of the impact of these factors on our operational and financial performance, including our ability to execute our business strategies and initiatives in the expected time frame, will depend on future developments, which are uncertain and cannot be predicted; however, any continued or renewed disruption resulting from these factors could negatively impact our business.

***We are a pre-commercial biotherapeutics company and have incurred significant losses since our inception and anticipate that we will continue to incur significant losses for the foreseeable future.***

We are a pre-commercial biotherapeutics company, and we have not yet generated any revenues from product sales. We have incurred net losses in each year since our inception in 2005, including consolidated net losses of $50.4 million for the year ended December 31, 2023. As of December 31, 2023, we had an accumulated deficit of $468.0 million.

We have devoted most of our financial resources to research and development, including our clinical and preclinical development activities. To date, we have financed our operations primarily through the sale of equity securities and convertible debt and through venture debt, term loans and license and collaboration agreement revenues. The amount of our future net losses will depend, in part, on the rate of our future expenditures and our ability to obtain funding through equity offerings, grant funding, collaborations, strategic partnerships and/or licensing arrangements. We have not completed registrational clinical trials for any product candidate to date and it will be several years, if ever, before we have a product candidate ready for commercialization. Even if we obtain regulatory approval to market a product candidate, our future revenues will depend, in part, upon the size of any markets in which our product candidates have received approval, and our ability to achieve sufficient market acceptance, reimbursement from third-party payors and adequate market share for our product candidates in those markets.

We expect to continue to incur significant expenses and operating losses for the foreseeable future. We anticipate that our expenses will fluctuate in connection with our ongoing activities as we: continue our research and preclinical and clinical development of efzofitimod or any other product candidates that we may develop; obtain clinical trial materials and further develop the manufacturing process for our product candidates; seek regulatory approvals for our product candidates that successfully complete clinical trials; ultimately establish a sales, marketing and distribution infrastructure to commercialize any products for which we may obtain marketing approval; seek to identify and validate additional product candidates; maintain, protect and expand our intellectual property portfolio; acquire or in-license other product candidates and technologies; attract and retain skilled personnel; and create additional infrastructure to support our operations as a public company and our product development and planned future commercialization efforts.

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

***We have never generated any revenue from product sales and may never be profitable.***

Our ability to generate revenue and achieve profitability depends on our ability, alone or with strategic collaboration partners, to successfully complete the development of, and obtain the regulatory approvals necessary to commercialize our product candidates. We do not anticipate generating revenues from product sales for the foreseeable future, if ever. Our ability to generate future revenues from product sales depends heavily on our success in:

- completing research, preclinical development and clinical development of our product candidates, potentially with a strategic partner;
- seeking and obtaining regulatory approvals for product candidates for which we complete clinical trials;
- developing a sustainable, scalable, reproducible, and transferable manufacturing process for our product candidates and establishing supply and manufacturing relationships with third parties;
- launching and commercializing product candidates for which we obtain regulatory approval, either by collaborating with a partner or, if launched independently, by establishing a sales force, marketing and distribution infrastructure;
- maintaining, protecting and expanding our intellectual property portfolio;
- obtaining market acceptance of our product candidates as viable treatment options for our target indications;
- identifying and validating new therapeutic product candidates;
- attracting, hiring and retaining qualified personnel; and
- negotiating favorable terms in any licensing, collaboration or other arrangements into which we may enter.

Even if one of our product candidates is approved for commercial sale, we anticipate incurring significant costs associated with commercializing any such approved product candidate. Our expenses could increase beyond expectations if we are required by the FDA or other regulatory agencies, domestic or foreign, to perform clinical trials and other studies in addition to those that we currently anticipate. Even if we are able to generate revenues from the sale of any approved products, we may not become profitable and may need to obtain additional funding to continue operations.

**Risks related to our reliance on third parties**

***We depend on our existing collaborations and may depend on collaborations with additional third parties for the development and commercialization of certain of our product candidates. If our collaborations are not successful, we may not be able to capitalize on the market potential of these product candidates.***

We have entered into, and may continue to enter into, research collaborations for the research and development of specified product candidates. Our sole source of revenue depends upon the performance by these collaborators of their responsibilities under these arrangements. For example, while we are eligible to receive up to an additional $155.0 million in milestone payments under the Kyorin Agreement, as well as tiered royalties ranging from the mid-single digits to mid-teens on any net sales in Japan, whether and when we receive these payments will depend on Kyorin's development and commercialization of efzofitimod in Japan, over which we have limited control. The development efforts of our collaborators are subject to the same risks and uncertainties described above with respect to our independently developed product candidates.

Some collaborators may not succeed in their product development efforts. It is possible that our collaborators may be unable to obtain regulatory approval of our product candidates or successfully market and commercialize any such products for which regulatory approval is obtained. For example, while we have received $20.0 million in upfront and milestone payments from Kyorin to date, if Kyorin's operations are limited as a result of global geopolitical and macroeconomic conditions or other reasons, the development of efzofitimod in Japan may be significantly delayed and adversely affected, which may in turn delay or limit our receipt of any additional payments under the Kyorin Agreement. Other collaborators may not devote sufficient time or resources to the programs covered by these arrangements, and we may have limited or no control over the time or resources allocated by these collaborators to these programs. The occurrence of any of these events may cause us to derive little or no revenue from these arrangements, lose opportunities to validate our product candidates, or force us to curtail or cease our development efforts in these areas.

Our collaborators may breach or terminate their agreements with us, including termination without cause, subject to certain prior written notice requirements, and we may be unsuccessful in entering into and maintaining other collaborative arrangements for the development of product candidates. For example, Kyorin has the right to terminate the agreement for any reason upon 90 days advance written notice to us. In addition, if we are unable to maintain existing collaboration arrangements or enter into new ones, our ability to generate licensing, milestone or royalty revenues would be materially impaired.

We may decide to enter into additional strategic partnerships, including collaborations with pharmaceutical and biotechnology companies, to enhance and accelerate the development and potential commercialization of our product candidates. We face significant competition in seeking appropriate partners, and the negotiation process is time-consuming and complex. Moreover, we may not be successful in our efforts to establish any new strategic partnership or other collaborative arrangement for any of our product candidates and programs for a variety of reasons, including strategic fit with partners and differences in analysis of commercial value and regulatory risk. We may not be able to negotiate strategic partnerships on a timely basis, on acceptable terms or at all. We are unable to predict when, if ever, we will enter into any new strategic partnership because of the numerous risks and uncertainties associated with establishing strategic partnerships. Even if we are successful in our efforts to establish new strategic partnerships, the terms that we agree upon may not be favorable to us and we may not be able to maintain such strategic partnerships if, for example, we encounter unfavorable results or delays during development or approval of a product candidate or sales of an approved product are lower than expectations.

***We rely, and expect to continue to rely, on third parties to conduct some or all aspects of our product manufacturing, protocol development, research and preclinical and clinical testing, and these third parties may not perform satisfactorily.***

We currently rely, and expect to continue to rely, on third parties to conduct some or all aspects of product manufacturing, protocol development, research and preclinical and clinical testing with respect to our product candidates. Any of these third parties may terminate their engagements with us at any time. If we need to enter into alternative arrangements, it could delay our product development activities. Our reliance on these third parties for research and development activities reduces our control over these activities but does not relieve us of our responsibility to ensure compliance with all required regulations and study protocols. For example, for any product candidates that we develop and commercialize on our own, we will remain responsible for ensuring that each of our clinical trials is conducted in accordance with the applicable study plan and protocols and GCPs so long as we continue to develop and commercialize on our own.

If these third parties do not successfully carry out their contractual duties, meet expected deadlines or conduct our research and development activities, including clinical trials, in accordance with regulatory requirements or our stated study plans and protocols, we will not be able to complete, or may be delayed in completing, the preclinical studies and clinical trials required to support future BLA submissions and approval of our product candidates.

***We rely and intend to rely on third parties to produce preclinical, clinical and commercial supplies of our product candidates.***

Other than some internal capacity to support preclinical activities, we do not have, nor do we plan to acquire, the infrastructure or capability internally to manufacture our preclinical and clinical quantities of our product candidates, and we lack the internal resources and capability to manufacture any of our product candidates on a clinical or commercial scale. Reliance on CDMOs entails risks to which we would not be subject if we manufactured the product candidates ourselves, including:

- the inability to negotiate manufacturing agreements with third parties under commercially reasonable terms;
- reduced control as a result of using third-party CDMOs for all aspects of manufacturing activities;
- termination or nonrenewal of manufacturing agreements with third parties in a manner or at a time that is costly or damaging to us; and
- disruptions to the operations of our CDMOs or suppliers caused by conditions unrelated to our business or operations, including the insolvency or bankruptcy of the CDMOs or suppliers.

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

Additionally, each CDMO may require licenses to manufacture our product candidates or components thereof if the applicable manufacturing processes are not owned by the CDMO or in the public domain, and we may be unable to transfer or sublicense the intellectual property rights we may have with respect to such activities. These factors could cause the delay of clinical development, regulatory submissions, required approvals or commercialization of our product candidates, cause us to incur higher costs and prevent us from commercializing our products successfully.

We do not have long-term contracts with our CDMOs, and our CDMOs may terminate their agreements with us for a variety of reasons including technical issues or our material breach of our obligations under the applicable agreement. Furthermore, our CDMOs may reallocate resources away from the production of our product candidates if we delay manufacturing under certain circumstances, and the manufacturing facilities in which our product candidates are made could be adversely affected by earthquakes and other natural disasters, labor shortages, power failures, economic slowdowns, higher interest rates, inflation and monetary supply shifts, evolving global geopolitical tension and numerous other factors. If our CDMOs fail to meet contractual requirements, and we are unable to secure one or more replacement CDMOs capable of production at a substantially equivalent cost, our clinical development activities may be delayed, or we could lose potential revenue. Manufacturing biologic drugs is complicated and tightly regulated by the FDA and comparable regulatory authorities around the world, and although alternative CDMOs with the necessary manufacturing and regulatory expertise and facilities exist, it could be expensive and take a significant amount of time to arrange for alternative CDMOs, transfer manufacturing procedures to these alternative CDMOs, and demonstrate comparability of material produced by such new CDMOs. New CDMOs of any product would be required to comply with applicable regulatory requirements. These CDMOs may not be able to manufacture our product candidates at costs, or in quantities, or in a timely manner necessary to complete the clinical development of our product candidates or make commercially successful products.

***We previously relied on a single CDMO for process development and scale-up of efzofitimod, including the manufacture of bulk drug substance for our projected needs for planned clinical trials. We have entered into an agreement with another CDMO for the transfer of the process, scale-up and manufacturing of bulk drug substance. If we want to eventually utilize product manufactured by the new CDMO for commercial purposes, the FDA will require us to demonstrate that the product manufactured by the new CDMO is comparable in quality, safety and efficacy to the product that is being used in the EFZO-FIT and EFZO-CONNECT studies.***

The current supply of efzofitimod being used in the EFZO-FIT and EFZO-CONNECT studies was produced by a prior CDMO. We have transitioned to a new CDMO that completed its first two commercial-scale cGMP runs during 2023. Full quality release testing has been completed and all release specifications were met, supporting the new CDMO's ability to produce bulk drug substance of efzofitimod for commercial purposes if we receive regulatory approval for efzofitimod. Because the change in CDMO has been introduced at an advanced stage of development of efzofitimod, the FDA will require a comparability assessment, including additional nonclinical or clinical studies utilizing the product manufactured by the new CDMO. These requirements could result in substantial delays and additional costs for clinical development, and commercialization of efzofitimod, or our inability to obtain approval for efzofitimod.

***We rely, and expect to continue to rely, on third parties to conduct, supervise and monitor our clinical trials, and if these third parties perform in an unsatisfactory manner, it may harm our business.***

We have relied, and expect to continue to rely, on third-party CROs, clinical investigators and clinical trial sites to ensure our clinical trials are conducted properly and on time. While we have and will continue to enter into agreements governing their activities, we will have limited influence over their actual performance. We will control only certain aspects of our CROs' activities. Nevertheless, we will be responsible for ensuring that each of our clinical trials is conducted in accordance with the applicable protocol, legal and regulatory requirements, and scientific standards, and our reliance on the CROs does not relieve us of our regulatory responsibilities.

We and our investigators and CROs are required to comply with GCPs for conducting, recording and reporting the results of clinical trials to assure that the data and reported results are credible and accurate and that the rights, integrity and confidentiality of clinical trial participants are protected. The FDA enforces GCPs through periodic inspections of study sponsors, principal investigators and clinical trial sites. If we or our investigators and CROs fail to comply with applicable GCPs, the clinical data generated in our future clinical trials may be deemed unreliable and the FDA may require us to perform additional unanticipated clinical trials before approving any marketing applications. Upon inspection, the FDA may determine that our clinical trials did not comply with GCPs. In addition, our future clinical trials will require a sufficient number of test subjects to evaluate the safety and effectiveness of our product candidates. Accordingly, if our investigators and CROs fail to comply with these regulations or fail to recruit a sufficient number of patients, we may be required to repeat such clinical trials, which would delay the regulatory approval process.

Our investigators and CROs are not our employees, and we are therefore unable to directly monitor whether or not they devote sufficient time and resources to our clinical and preclinical programs. They may also have relationships with other commercial entities, including our competitors, for whom they may also be conducting clinical trials or other drug development activities that could harm our competitive position. If our investigators or CROs do not successfully carry out their contractual duties or obligations, fail to meet expected deadlines, or if the quality or accuracy of the clinical data they obtain is compromised due to the failure to adhere to our clinical protocols or regulatory requirements, or for any other reasons, our clinical trials may be extended, delayed or terminated, and we may not be able to obtain regulatory approval for, or successfully commercialize our product candidates. As a result, enrollment and data integrity from monitoring of the trial may suffer, our financial results could be harmed, our costs could increase, our ability to generate revenues could be delayed and the commercial prospects for our product candidates could be adversely affected.

***Our reliance on third parties requires us to share our trade secrets, which increases the possibility that a competitor will discover them or that our trade secrets will be misappropriated or disclosed.***

We rely on third parties to manufacture our product candidates, and we collaborate with both industry and various academic institutions in the development of our discovery platform for therapeutic applications based on tRNA synthetase biology. In connection with these activities, we are required, at times, to share trade secrets with them. We seek to protect our proprietary technology in part by entering into confidentiality agreements and, if applicable, material transfer agreements, collaborative research agreements, consulting agreements or other similar agreements with our collaborators, advisors, employees and consultants prior to beginning research or disclosing proprietary information. These agreements typically limit the rights of the third parties to use or disclose our confidential information, such as trade secrets. Despite the contractual provisions employed when working with third parties, the need to share trade secrets and other confidential information increases the risk that such trade secrets become known by our competitors, are inadvertently incorporated into the technology of others, or are disclosed or used in violation of these agreements. Given that our proprietary position is based, in part, on our know-how and trade secrets, a competitor's discovery of our trade secrets or other unauthorized use or disclosure would impair our competitive position and may have a material adverse effect on our business, prospects, financial condition and results of operations.

In addition, these agreements typically restrict the ability of our collaborators, advisors, employees and consultants to publish data potentially relating to our trade secrets. Our academic collaborators typically have rights to publish data, provided that we are notified in advance and may delay publication for a specified time in order to secure intellectual property rights to which we are entitled arising from the collaboration. In other cases, publication rights are controlled exclusively by us, although in some cases we may share these rights with other parties. We also conduct joint research and development programs that may require us to share trade secrets under the terms of our research and development partnerships or similar agreements. Despite our efforts to protect our trade secrets, our competitors may discover our trade secrets, either through breach of these agreements, independent development or publication of information including our trade secrets in cases where we do not have proprietary or otherwise protected rights at the time of publication. A competitor's discovery of our trade secrets would impair our competitive position and have an adverse impact on our business, prospects, financial condition and results of operations.

**Risks related to our intellectual property**

***If we are unable to obtain, maintain or protect intellectual property rights related to our product candidates, or if the scope of such intellectual property protection is not sufficiently broad, we may not be able to compete effectively in our markets.***

We rely upon a combination of patents, trade secret protection and confidentiality agreements to protect the intellectual property related to our technologies and product candidates. Our success depends in large part on our and our licensors' abilities to obtain and maintain patent and other intellectual property protection in the United States and in other countries for our proprietary technology and product candidates.

We have sought to protect our proprietary position by filing patent applications in the United States and abroad related to our novel technologies and product candidates that are important to our business. This process is expensive and time consuming, and we may not be able to file and prosecute all necessary or desirable patent applications at a reasonable cost or in a timely manner. It is also possible that we will fail to identify patentable aspects of our research and development output before it is too late to obtain patent protection.

The patentability of inventions, and the validity, enforceability and scope of patents in the biotechnology and pharmaceutical fields involves complex legal and scientific questions and can be uncertain. As a result, patent applications that we own or in-license may not issue as patents with claims that cover our product candidates, or at all, in the United States or in foreign countries for many reasons. For example, there is no assurance that we were the first to invent or the first to file patent applications in respect of the inventions claimed in our patent applications or that our patent applications claim patentable subject matter. We may also be unaware of potentially relevant prior art relating to our patents and patent applications, and this prior art, if any, may be used by third parties as grounds to seek to invalidate a patent or to prevent a patent from issuing from a pending patent application. Even if patents do successfully issue and even if such patents disclose aspects of our product candidates, third parties may challenge their validity, enforceability or scope, which may result in such patents being narrowed or invalidated. Furthermore, even if they are unchallenged, our patents and patent applications may not adequately protect our intellectual property, provide exclusivity for our product candidates or prevent others from designing around our claims. If the breadth or strength of protection provided by the patents and patent applications we hold, license or pursue with respect to our product candidates is threatened, it could threaten our ability to commercialize our product candidates. Further, if we encounter delays in our clinical trials, the period of time during which we could market any of our product candidates under patent protection, if approved, would be reduced. Since patent applications in the United States and most other countries are confidential for a period of time after filing, we cannot be certain that we were the first to file any patent application related to our product candidates. Changes to the patent laws in the United States and other jurisdictions could also diminish the value of our patents and patent applications or narrow the scope of our patent protection. Any of these outcomes could impair our ability to prevent competition from third parties, which may have an adverse effect on our business.

If the patent applications we own or have in-licensed that relate to our programs or product candidates do not issue as patents, if their breadth or strength of protection is threatened, or if they fail to provide exclusivity for our product candidates, it could dissuade companies from collaborating with us to develop product candidates, and threaten our ability to commercialize future products. We cannot offer any assurances about which, if any, patents will issue, the breadth of any such patents or whether any issued patents will be found invalid and unenforceable or will be threatened by third parties. Any successful opposition to these patents or any other patents owned by or licensed to us could deprive us of rights necessary for the successful commercialization of any product candidates that we may develop. In addition, patents have a limited term. In the United States, the natural expiration of a patent is generally 20 years after it is filed. Although various extensions may be available, the life of a patent, and the protection it affords, is limited. Even if a patent does issue for any of our pending patent applications, possible delays in regulatory approvals could mean that the period of time during which we could market a product candidate under patent protection could be reduced from what we generally would expect. Since 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 were the first to file any patent application related to a product candidate. Furthermore, if third parties have filed such patent applications, an interference proceeding in the United States can be initiated by a third party to determine who was the first to invent any of the subject matter covered by the patent claims of our applications. Even if patents covering aspects of our product candidates are obtained, once the patent life has expired for a product, we may be open to competition from generic medications.

In addition to the protection afforded by patents, we rely on trade secret protection and confidentiality agreements to protect proprietary know-how that is not patentable or that we elect not to patent, processes for which patents are difficult to enforce and any other elements of our product candidate discovery and development processes that involve proprietary know-how, information or technology that is not covered by patents. However, trade secrets can be difficult to protect. We seek to protect our proprietary technology and processes, in part, by entering into confidentiality agreements with our employees, consultants, scientific advisors and contractors. We also seek to preserve the integrity and confidentiality of our data and trade secrets by maintaining physical security of our premises and physical and electronic security of our information technology systems, but it is possible that these security measures could be breached. Although we expect all of our employees and consultants to assign their inventions to us, and all of our employees,

consultants, advisors and any third parties who have access to our proprietary know-how, information or technology to enter into confidentiality agreements, we cannot provide any assurances that all such agreements have been duly executed or that our trade secrets and other confidential proprietary information will not be disclosed or that competitors will not otherwise gain access to our trade secrets or independently develop substantially equivalent information and techniques. For example, any of these 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 impair our competitive position and may have a material adverse effect on our business. Additionally, if the steps we take to maintain the confidentiality of our trade secrets are inadequate, we may have insufficient recourse against third parties for misappropriating our proprietary information and processes. In addition, others may independently discover our trade secrets and proprietary information. For example, the FDA, as part of its Transparency Initiative, is currently considering whether to make additional information publicly available on a routine basis, including information that we may consider to be trade secrets or other proprietary information, and it is not clear at the present time how the FDA's disclosure policies may change in the future, if at all.

If due to the effects on our operations of general political and economic conditions, including global geopolitical tension, armed conflicts, potential future health pandemics, labor shortages, economic slowdowns, recessions or market corrections, inflation and monetary supply shifts, higher interest rates and tightening of credit markets, or another cause, we are unable to generate new animal, or *in vitro* data, in time to support new, or updated patent application filings, or prior to patent conversion deadlines, it could materially impact the enforceability or scope of those patent filings.

If we are unable to prevent material disclosure of the non-patented intellectual property related to our technologies to third parties, and there is no guarantee that we will have any such enforceable trade secret protection, we may not be able to establish or maintain a competitive advantage in our market, which could materially adversely affect our business, results of operations and financial condition.

Further, the laws of some foreign countries do not protect proprietary rights to the same extent or in the same manner as the laws of the United States. As a result, we may encounter significant problems in preventing third parties from practicing our inventions in countries outside the United States, or from selling or importing products made using our inventions in and into the United States or other jurisdictions.

***Claims that our product candidates or the manufacture, sale or use of our future products infringe the patent or other intellectual property rights of third parties could result in costly litigation or could require substantial time and money to resolve, even if litigation is avoided.***

Our commercial success depends in part on our avoiding infringement of the patents and proprietary rights of third parties. There is a substantial amount of litigation, both within and outside the United States, involving patent and other intellectual property rights in the biotechnology and pharmaceutical industries, including patent infringement lawsuits, interferences, oppositions and inter partes reexamination proceedings before the United States Patent and Trademark Office (USPTO) and corresponding foreign patent offices. Numerous U.S. and foreign issued patents and pending patent applications, which are owned by third parties, exist in the fields in which we are pursuing development candidates. As the biotechnology and pharmaceutical industries expand and more patents are issued, the risk increases that our product candidates may be subject to claims of infringement of the patent rights of third parties.

Third parties may assert that we are employing their proprietary technology without authorization. There may be third-party patents or patent applications with claims to materials, formulations, methods of manufacture or methods for treatment related to the use or manufacture of our product candidates. Because patent applications can take many years to issue, there may be currently pending patent applications which may later result in issued patents that our product candidates may infringe. In addition, third parties may obtain patents in the future and claim that use of our technologies infringes upon these patents. If any third-party patents were held by a court of competent jurisdiction to cover the formulations for, or the manufacturing process or methods of use of, any of our product candidates, any molecules formed during the manufacturing process or any final product itself, the holders of any such patents may be able to block our ability to develop and commercialize such product candidate unless we obtained a license under the applicable patents, or until such patents expire. In either case, such a license may not be available on commercially reasonable terms or at all.

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 employee resources from our business. In the event of a successful claim of infringement against us, we may have to pay substantial damages, including treble damages and attorneys' fees for willful infringement, pay royalties, redesign our infringing products or obtain one or more licenses from third parties, which may not be able to be obtained on reasonable commercial terms or at all, or require substantial time and monetary expenditure.

***Patent terms may be inadequate to protect our competitive position on our product candidates for an adequate amount of time.***

Patents have a limited lifespan. In the United States, if all maintenance fees are timely paid, the natural expiration of a patent is generally 20 years from its earliest U.S. non-provisional 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, we may be open to competition from competitive products, including generics or biosimilars. Given the amount of time required for the development, testing and regulatory review of new product candidates, patents protecting such candidates might expire before or shortly after such candidates are commercialized. As a result, our owned and licensed patent portfolio may not provide us with sufficient rights to exclude others from commercializing products similar or identical to ours.

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

We believe that we have rights to intellectual property, through licenses from third parties and under patents that we own, that is necessary or useful to develop our product candidates. Because our programs may involve additional product candidates that may require the use of proprietary rights held by third parties, the growth of our business will likely depend in part on our ability to acquire, in-license or use these proprietary rights. In addition, our product candidates may require specific formulations to work effectively and efficiently and these rights may be held by others. We may be unable to acquire or in-license any compositions, methods of use, processes or other third-party intellectual property rights from third parties that we identify on reasonable commercial terms or at all. The licensing and acquisition of third-party intellectual property rights is a competitive area, and a number of more established companies are also pursuing strategies to license or acquire third-party intellectual property rights that we may consider attractive. These established companies may have a competitive advantage over us due to their size, cash resources and greater clinical development and commercialization capabilities.

We sometimes collaborate with U.S. and foreign academic institutions to accelerate our preclinical research or development under written agreements with these institutions. These institutions may provide us with an option to negotiate a license to the institution's rights in technology resulting from the collaboration. Regardless of any such right of first negotiation for intellectual property, we may be unable to negotiate a license within the specified timeframe or under terms that are acceptable to us. If we are unable to do so, the institution may offer the intellectual property rights to other parties, potentially blocking our ability to pursue our program.

In addition, companies that perceive us to be a competitor may be unwilling to assign or license rights to us. We also may be unable to license or acquire third-party intellectual property rights on terms that would allow us to make an appropriate return on our investment. If we are unable to successfully obtain rights to required third-party intellectual property rights, our business, financial condition and prospects for growth could suffer.

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

We are a party to a number of intellectual property license agreements that are important to our business and expect to enter into additional license agreements in the future. Our existing license agreements impose, and we expect that future license agreements will impose, various diligence, milestone payment, royalty and other obligations on us. If we fail to comply with our obligations under these agreements, or we are subject to a bankruptcy, the licensor may have the right to terminate the license, in which event we would not be able to market products covered by the license.

We may need to obtain licenses from third parties to advance our research or allow commercialization of our product candidates, and we have done so from time to time. We may fail to obtain any of these licenses at a reasonable cost or on reasonable commercial terms, if at all. In that event, we may be required to expend significant time and resources to develop or license replacement technology. If we are unable to do so, we may be unable to develop or commercialize the affected product candidates, which could harm our business significantly.

In some cases, patent prosecution of our licensed technology is controlled by the licensor. If our licensors fail to obtain and maintain patent or other protection for the proprietary intellectual property we license from them, we could lose our rights to the intellectual property or our exclusivity with respect to those rights, and our competitors could market competing products using such intellectual property. In certain cases, we may control the prosecution of patents resulting from licensed technology. In the event we breach any of our obligations related to such prosecution, we may incur significant liability to our licensors. Licensing of intellectual property is of critical importance to our business and involves complex legal, business and scientific issues and is complicated by the rapid pace of scientific discovery in our industry. Disputes may arise regarding intellectual property subject to a license agreement, including:

- the scope of rights granted under the license agreement and other interpretation-related issues;
- the extent to which our technology and processes infringe on intellectual property of the licensor that is not subject to the license agreement;
- the sublicensing of patent and other rights under our collaborative development relationships;
- our diligence obligations under the license agreement and what activities satisfy those diligence obligations;
- the ownership of inventions and know-how resulting from the joint creation or use of intellectual property by our licensors and us and our sublicensees or partners, if any; 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.

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

Competitors may infringe or otherwise violate our patents, the patents of our licensors or our other intellectual property rights. To counter infringement or unauthorized use, we may be required to file infringement claims, which can be expensive and time-consuming. Any claims that we assert against perceived infringers could also provoke these parties to assert counterclaims against us alleging that we infringe their intellectual property rights. In addition, in an infringement proceeding, a court may decide that a patent of ours or our licensors is not valid, is unenforceable or is not infringed, or may refuse to stop the other party from using the technology at issue on the grounds that our patents do not cover the technology in question. An adverse result in any litigation or defense proceedings could put one or more of our patents at risk of being invalidated or interpreted narrowly and could put our patent applications at risk of not issuing.

Interference or derivation proceedings provoked by third parties or brought by us may be necessary to determine the priority of inventions or other matters of inventorship with respect to our patents or patent applications or those of our licensors. We may also become involved in other proceedings, such as re-examination or opposition proceedings, before the USPTO or its foreign counterparts relating to our intellectual property or the intellectual property rights of others. An unfavorable outcome in any such proceedings could require us to cease using the related technology or to attempt to license rights to it from the prevailing party, or could cause us to lose valuable intellectual property rights. Our business could be harmed if the prevailing party does not offer us a license on commercially reasonable terms, if any license is offered at all. Our defense of litigation or interference proceedings may fail and, even if successful, may result in substantial costs and distract our management and other employees. We may not be able to prevent, alone or with our licensors, misappropriation of our intellectual property rights, particularly in countries where the laws may not protect those rights as fully as in the United States. In addition, the uncertainties associated with litigation could have a material adverse effect on our ability to raise the funds necessary to continue our clinical trials, continue our research programs, license necessary technology from third parties, or enter into development partnerships that would help us bring our product candidates to market. We may also become involved in disputes with others regarding the ownership of intellectual property rights. For example, we jointly develop intellectual property with certain parties, and disagreements may therefore arise as to the ownership of the intellectual property developed pursuant to these relationships. If we are unable to resolve these disputes, we could lose valuable intellectual property rights.

Furthermore, because of the substantial amount of discovery required in connection with intellectual property litigation, there is a risk that some of our confidential information could be compromised by disclosure during this type of litigation. There could also be public announcements of the results of hearings, motions or other interim proceedings or developments. If securities analysts or investors perceive these results to be negative, it could have a material adverse effect on the price of our common stock.

***We may be subject to claims that our employees, consultants or independent contractors have wrongfully used or disclosed confidential information of third parties or that our employees have wrongfully used or disclosed alleged trade secrets of their former employers.***

We employ individuals who were previously employed at universities or other biotechnology or pharmaceutical companies, including our competitors or potential competitors. Although we try to ensure that our employees, consultants and independent contractors 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 our employees, consultants or independent contractors have inadvertently or otherwise used or disclosed intellectual property, including trade secrets or other proprietary information, of any of our employee's former employer or other third parties. Litigation may be necessary to defend against these claims. If we fail in defending any such claims, in addition to paying monetary damages, we may lose valuable intellectual property rights or personnel, which could adversely impact our business. Even if we are successful in defending against such claims, litigation could result in substantial costs and be a distraction to management and other employees.

***We may be subject to claims challenging the inventorship or ownership of our patents and other intellectual property.***

We may be subject to claims that former employees, collaborators or other third parties have an ownership interest in our patents or other intellectual property. For example, we may have inventorship disputes arise from conflicting obligations of consultants or others who are involved in developing our product candidates. Litigation may be necessary to defend against these and other claims challenging inventorship or ownership, or we may enter into agreements to clarify the scope of our rights in such intellectual property. If we fail in defending any such claims, in addition to paying monetary damages, we may lose valuable intellectual property rights, such as exclusive ownership of, or right to use, valuable intellectual property. Such an outcome could have a material adverse effect on our business. Even if we are successful in defending against such claims, litigation could result in substantial costs and be a distraction to management and other employees.

***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 fees, renewal fees, annuity fees and various other governmental fees on patents or applications will be due to be paid to the USPTO and various governmental patent agencies outside of the United States in several stages over the lifetime of the patents or applications. We have systems in place to remind us to pay these fees, and we employ an outside firm and rely on our outside counsel to pay these fees due to non-U.S. patent agencies. The USPTO and various non-U.S. governmental patent agencies require compliance with a number of procedural, documentary, fee payment and other similar provisions during the patent application process. We employ law firms and other professionals to help us comply, and in many cases, an inadvertent lapse can be cured by payment of a late fee or by other means in accordance with the applicable rules. However, there are situations in which non-compliance 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. In such an event, our competitors might be able to enter the market and this circumstance would have a material adverse effect on our business.

***Issued patents covering our product candidates could be found invalid or unenforceable if challenged in court.***

If we or one of our licensors initiated legal proceedings against a third party to enforce a patent covering one of our product candidates, the defendant could counterclaim that the patent covering our product candidate is invalid or unenforceable. In patent litigation in the United States, defendant counterclaims alleging invalidity or unenforceability are commonplace. Grounds for a validity challenge could be an alleged failure to meet any of several statutory requirements, including lack of novelty, obviousness or non-enablement. Grounds for an unenforceability assertion could be an allegation that someone connected with prosecution of the patent withheld relevant information from the USPTO, or made a misleading statement, during prosecution. Third parties may also raise similar claims before administrative bodies in the United States or abroad, even outside the context of litigation. Such mechanisms include re-examination, post grant review, and equivalent proceedings in foreign jurisdictions (e.g., opposition proceedings). Such proceedings could result in revocation or amendment to our patents in such a way that they no longer cover our product candidates. The outcome following legal assertions of invalidity and unenforceability is unpredictable. With respect to the validity question, for example, we cannot be certain that there is no invalidating prior art, of which we and the patent examiner were unaware during prosecution. If a defendant were to prevail on a legal assertion of invalidity or unenforceability, we would lose at least part, and perhaps all, of the patent protection on our product candidates. Such a loss of patent protection would have a material adverse effect on our business.

***Changes in patent law could diminish the value of patents in general, thereby impairing our ability to protect our products.***

As is the case with many other biotechnology companies, our success is heavily dependent on intellectual property, particularly patents. Obtaining and enforcing patents in the biotechnology industry involve both technological and legal complexity, and therefore obtaining, maintaining and enforcing biotechnology patents is costly, time-consuming and inherently uncertain. In addition, recent legislative and judicial developments in the United States and elsewhere have in some cases removed the protection afforded to patent owners, made patents more difficult to obtain, or increased the uncertainty regarding the ability to obtain, maintain and enforce patents. For example, Congress has recently passed, and the United States is currently implementing, wide-ranging patent reform legislation, and may pass further patent reform legislation in the future. Recent U.S. Supreme Court rulings have narrowed the scope of patent protection available in certain circumstances and weakened the rights of patent owners in certain situations. For example, in *Association for Molecular Pathology v. Myriad Genetics, Inc.*, the U.S. Supreme Court held that certain claims to naturally occurring substances are not patentable. Although we do not believe that any of the patents owned or licensed by us will be found invalid based on this decision, we cannot predict how future decisions by the courts, Congress, or the USPTO may impact the value of our patents. In addition to increasing uncertainty with regard to our ability to obtain patents in the future, this combination of events has created uncertainty with respect to the value of patents generally, once obtained. Depending on decisions and actions by Congress, the federal courts, the USPTO and their respective foreign counterparts, the laws and regulations governing patents could change in unpredictable ways that would weaken our ability to obtain new patents or to maintain and enforce our existing patents and patents that we might obtain in the future.

***Patent reform legislation could increase the uncertainties and costs surrounding the prosecution of our patent applications and the validity or defense of our issued patents.***

On September 16, 2011, the Leahy-Smith America Invents Act (the Leahy-Smith Act) was signed into law. The Leahy-Smith Act includes a number of significant changes to U.S. patent law, including provisions that affect the way patent applications will be prosecuted and may also affect patent litigation. The USPTO is developing regulations and procedures to govern administration of the Leahy-Smith Act, and many of the substantive changes to patent law associated with the Leahy-Smith Act, and in particular, the first to file provisions, were enacted March 16, 2013. Although it is not clear what, if any, impact the Leahy-Smith Act will have on the operation of our business, 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 and financial condition.

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

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

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, trade secrets and other intellectual property protection, particularly those relating to biotechnology products, which could make it difficult for us to stop the infringement of our patents or marketing of competing products in violation of our proprietary rights generally. Proceedings to enforce our patent rights in foreign jurisdictions could result in substantial costs and divert our efforts and attention from other aspects of our business, could put our patents at risk of being invalidated or interpreted narrowly and our patent applications at risk of not issuing and could provoke third parties to assert claims against us. We may not prevail in any lawsuits that we initiate and the damages or other remedies awarded, if any, may not be commercially meaningful. Accordingly, our efforts to enforce our intellectual property rights around the world may be inadequate to obtain a significant commercial advantage from the intellectual property that we develop or license.

**Risks related to our business operations**

***We may use our financial and human resources to pursue a particular business strategy, research program or product candidate and fail to capitalize on strategies, programs or product candidates that may be more profitable or for which there is a greater likelihood of success.***

Because we have limited resources, we may forego or delay pursuit of certain strategic opportunities or opportunities with certain programs, product candidates or indications that later prove to have greater commercial potential. We may focus on or pursue one indication over another potential indication and such development efforts may not be successful, which would cause us to delay the clinical development and approval of efzofitimod and other product candidates. In addition, our decisions as to which of our discovery programs to advance into preclinical and clinical development could preclude us from advancing others. Our resource allocation decisions may cause us to fail to capitalize on viable commercial products or profitable market opportunities. For example, based on analysis from an independent consultant that we engaged during 2022, we estimate that there is a $2-3 billion dollar market opportunity in pulmonary sarcoidosis and SSc-ILD in our own modeling. Depending on the accuracy of this estimate, we may not be most efficiently allocating resources toward the advancement of efzofitimod versus the advancement of other development efforts. In addition, we may elect to pursue a research, clinical or commercial strategy that ultimately does not yield the results that we desire. Our spending on current and future research and development programs for product candidates may not result in any commercially viable products. If we do not accurately evaluate the commercial potential or target market for a particular product candidate, we may relinquish valuable rights to that product candidate through strategic collaboration, licensing or other royalty arrangements in cases in which it would have been more advantageous for us to retain sole development and commercialization rights to such product candidate, or we may allocate internal resources to a product candidate in a therapeutic area or market in which it would have been more advantageous to enter into a partnering arrangement. Any failure to allocate resources or capitalize on strategies in a successful manner will have an adverse impact on our business.

***Our future success depends on our ability to retain key employees, consultants and advisors and to attract, retain and motivate qualified personnel.***

We are highly dependent on principal members of our executive team, the loss of whose services may adversely impact the achievement of our objectives. While we have entered into employment agreements with each of our executive officers, any of them could leave our employment at any time, as all of our employees are "at will" employees. Recruiting and retaining other qualified employees, consultants and advisors for our business, including scientific and technical personnel, will also be critical to our success.

In response to competition, higher rates of inflation and labor shortages, we may need to adjust employee cash compensation, which would affect our operating costs and our margins, or equity compensation, which would affect our outstanding share count and cause dilution to existing stockholders. We may not be able to attract and retain personnel on acceptable terms given the competition among numerous pharmaceutical and biotechnology companies for individuals with similar skill sets. In addition, the available pool of skilled employees may be further reduced if immigration laws change in a manner that increases restrictions on immigration. Further, failure to succeed in preclinical studies or clinical trials may make it more challenging to recruit and retain qualified personnel. The inability to recruit or loss of the services of any executive, key employee, consultant or advisor may impede the progress of our research, development and commercialization objectives.

***We may undertake internal restructuring activities in the future that could result in disruptions to our business or otherwise materially harm our results of operations or financial condition.***

From time to time we may undertake internal restructuring activities as we continue to evaluate and attempt to optimize our cost and operating structure in light of developments in our business strategy and long-term operating plans. For example, we implemented a corporate and program prioritization plan in May 2018 that included a reduction in our workforce. Any such restructuring activities may result in write-offs or other restructuring charges. There can be no assurance that any restructuring activities that we have undertaken or undertake in the future will achieve the cost savings, operating efficiencies or other benefits that we may initially expect. Restructuring activities may also result in a loss of continuity, accumulated knowledge and inefficiency during transitional periods and thereafter. In addition, internal restructurings can require a significant amount of time and focus from management and other employees, which may divert attention from commercial operations. If any internal restructuring activities we have undertaken or undertake in the future fail to achieve some or all of the expected benefits therefrom, our business, results of operations and financial condition could be materially and adversely affected.

***We are subject to a variety of risks associated with international operations that could materially adversely affect our business.***

We currently conduct research activities through Pangu BioPharma Limited, in collaboration with the Hong Kong University of Science and Technology. Additionally, we have conducted clinical trials in the EU and in Australia and may conduct future clinical trials internationally. Our partner, Kyorin, conducted and funded an efzofitimod Phase 1 clinical trial in healthy volunteers in Japan, and has joined the EFZO-FIT study, a global Phase 3 clinical trial designed to enroll up to 264 subjects at multiple centers in United States, Europe, Brazil and Japan. If any of our product candidates are approved for commercialization outside of the United States, we expect to either use our own sales organization or selectively enter into agreements with third parties to market our products on a worldwide basis or in more limited geographical regions, as with Kyorin and efzofitimod in Japan. We are, and we expect that we will continue to be, subject to a variety of risks related to international operations, including, but not limited to: liquidity concerns at, and failures of, banks and other financial institutions or other disruptions in the banking system or financing markets, different regulatory requirements for approval of drugs and biologics in foreign countries; reduced or uncertain protection for intellectual property; unexpected changes in tariffs, trade barriers and regulatory requirements; economic weakness, including labor shortages, economic slowdowns, recessions, inflation and monetary supply shifts, higher interest rates and tightening of credit markets, or political instability in particular foreign economies and markets, including global geopolitical tension and armed conflicts; compliance with tax, employment, immigration and labor laws for employees living or traveling abroad; foreign currency fluctuations, which could result in reduced revenues, and other obligations incident to doing business in another country; and the global impacts of potential future health pandemics.

Any failure to continue our international operations or to commercialize our product candidates outside of the United States may impair our ability to generate revenues and harm our business, prospects and results of operations.

***Our employees, principal investigators, consultants and commercial partners may engage in misconduct or other improper activities, including non-compliance with regulatory standards and requirements and insider trading.***

We are exposed to the risk of fraud or other misconduct by our employees, principal investigators, consultants and commercial partners. Misconduct by these parties could include intentional failures to comply with the regulations of the FDA and non-U.S. regulators, provide accurate information to the FDA and non-U.S. regulators, comply with healthcare fraud and abuse laws and regulations in the United States and abroad, report financial information or data accurately or disclose unauthorized activities to us. In particular, sales, marketing and business arrangements in the healthcare industry are subject to extensive laws and regulations intended to prevent fraud, misconduct, kickbacks, 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. Such misconduct could also involve the improper use of information obtained in the course of clinical trials, which could result in significant regulatory sanctions and cause serious harm to our reputation. We have adopted a code of business conduct and ethics applicable to all of our employees, but it is not always possible to identify and deter employee misconduct, and the precautions we take to detect and prevent 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.

***We face potential product liability, and, if successful claims are brought against us, we may incur substantial liability and costs. If the use of our product candidates harm patients, or is perceived to harm patients even when such harm is unrelated to our product candidates, our regulatory approvals could be revoked or otherwise negatively impacted and we could be subject to costly and damaging product liability claims.***

The use of our product candidates in clinical trials and the sale of any products for which we obtain marketing approval exposes us to the risk of product liability claims. Product liability claims might be brought against us by patients, healthcare providers, pharmaceutical companies or others selling or otherwise coming into contact with our products. There is a risk that our product candidates may induce adverse events. If we cannot successfully defend against product liability claims, we could incur substantial liability and costs. In addition, regardless of merit or eventual outcome, product liability claims may result in:

- impairment of our business reputation;
- withdrawal of clinical trial participants;
- costs due to related litigation;
- distraction of management's attention from our primary business;
- substantial monetary awards to patients or other claimants;
- the inability to commercialize our product candidates; and
- decreased demand for our product candidates, if approved for commercial sale.

We carry product liability insurance for our clinical trials covering $10.0 million per occurrence and up to $10.0 million in the aggregate, subject to certain deductibles and exclusions. Although we believe the amount of our insurance coverage is typical for companies similar to us in our industry, we may not have adequate insurance coverage or be able to maintain insurance coverage at a reasonable cost or in sufficient amounts to protect us against losses due to liability. If and when we obtain marketing approval for product candidates, we intend to expand our insurance coverage to include the sale of commercial products; however, we may be unable to obtain product liability insurance on commercially reasonable terms or in adequate amounts. On occasion, large judgments have been awarded in class action lawsuits based on drugs or medical treatments that had unanticipated adverse effects. A successful product liability claim or series of claims brought against us could cause our stock price to decline and adversely affect our reputation and, if judgments exceed our insurance coverage, could adversely affect our results of operations and business.

Patients with the diseases targeted by our product candidates are often already in severe and advanced stages of disease and may have both known and unknown significant pre-existing and potentially life-threatening health risks. During the course of treatment, patients may suffer adverse events, including death, for reasons that may be related to our product candidates. Such events could subject us to costly litigation, require us to pay substantial amounts of money to injured patients, delay, negatively impact or end our opportunity to receive or maintain regulatory approval to market our products, or require us to suspend or abandon our commercialization efforts. Even in a circumstance in which we do not believe that an adverse event is related to our products, the investigation into the circumstance may be time-consuming or inconclusive. These investigations may interrupt our sales efforts, delay our regulatory approval process in other countries, or impact and limit the type of regulatory approvals our product candidates receive or maintain. As a result of these factors, a product liability claim, even if successfully defended, could have a material adverse effect on our business, financial condition or results of operations.

***We are, or may become, subject to stringent and evolving U.S. and foreign laws, regulations, rules, policies, contractual obligations, industry standards, and other obligations related to data privacy and security. Our actual or perceived failure to comply with such obligations could have a material adverse effect on our business and financial condition, including a disruption of clinical trials or commercialization of products; regulatory investigations or actions; litigation (including class claims) and mass arbitration demands; fines and penalties; reputational harm; loss of revenue or profits; and other adverse business consequences.***

We collect, receive, store, process, use, generate, transfer, disclose, make accessible, protect, secure, dispose of, transmit and share (Process or Processing) personal data and other sensitive information, including information we or our third party partners (such

as CROs and clinical trial sites) collect about patients and healthcare providers in connection with clinical trials necessary to operate our business.

Therefore, our data Processing activities subject us to numerous data privacy and security laws, regulations, rules, guidance, and industry standards as well as external and internal data privacy and security policies, contractual requirements and other obligations that apply to the Processing of personal (and other sensitive) data both by us and on our behalf (collectively, Data Protection Requirements). The number and scope of the Data Protection Requirements are changing, becoming increasingly stringent, creating uncertainty, subject to differing applications and interpretations, and may be inconsistent between jurisdictions. These Data Protection Requirements may require us to change our business model. New Data Protection Requirements may be proposed or enacted. Additionally, given the breadth and evolving nature of Data Protection Requirements (and consumers' data privacy expectations), preparing for and complying with these requirements is rigorous, time-intensive and requires significant resources and a review of our technologies, systems and practices, as well as those of any third-party collaborators, service providers, contractors or consultants that Process personal data on our behalf. We may at times fail (or be perceived to have failed) in our efforts to comply with our Data Protection Requirements. Moreover, despite our efforts, our personnel or third parties upon whom we rely may fail to comply with such obligations, which could negatively impact our business operations and compliance posture.

If we or the third parties upon which we rely fail, or are perceived to have failed, to address or comply with Data Protection Requirements, this could result in government enforcement actions against us that could include investigations, fines, penalties, audits and inspections, additional reporting requirements and/or oversight, temporary or permanent bans on all or some Processing of personal data, or orders to destroy or not use personal data. Further, individuals or other relevant stakeholders could bring a variety of claims (including class claims and mass arbitration demands) against us for our actual or perceived failure to comply with the Data Protection Requirements. In particular, plaintiffs have become increasingly more active in bringing privacy-related claims against companies, including class claims and mass arbitration demands. Some of these claims allow for the recovery of statutory damages on a per violation basis, and, if viable, carry the potential for monumental statutory damages, depending on the volume of data and the number of violations. Any of these events could have a material adverse effect on our reputation, business, or financial condition, and could lead to a loss of actual or prospective customers, collaborators or partners; interrupt or stop our clinical trials; result in an inability to Process personal data or to operate in certain jurisdictions; limit our ability to develop or commercialize our products; require us to revise, restructure or substantially change our operations; or otherwise materially adversely affect our operations (each, a Material Adverse Impact).

In the United States, federal, state and local governments have enacted numerous data privacy and security laws, including data breach notification laws, personal data privacy laws, consumer protection laws (e.g., Section 5 of the Federal Trade Commission Act). and other similar laws (e.g. wiretapping laws). For example, the California Consumer Privacy Act of 2018, as amended by the California Privacy Rights Act of 2020 (CPRA), (collectively, CCPA) applies to personal data of consumers, business representatives, and employees who are California residents, and requires businesses to provide specific disclosures in privacy notices and honor requests of California residents to exercise certain privacy rights, such as those noted below. The CCPA provides for fines of up to $7,500 per intentional violation and allows private litigants affected by certain data breaches to recover significant statutory damages. Although the CCPA exempts some data Processed in the context of clinical trials, the CCPA may increase compliance costs and potential liability with respect to other personal data maintained about California residents. In addition, the CPRA expanded the CCPA's requirements and established a regulatory agency to implement and enforce the law. Other states have also passed or are considering comprehensive privacy laws, with actions also being considered at the federal and local levels. These state laws and the CCPA provide individuals with certain rights concerning their personal data, including the right to access, correct, or delete certain personal data, and opt-out of certain data Processing activities, such as targeted advertising, profiling, and automated decision-making. The exercise of these rights may impact our business and ability to provide our products and services. While these states, like the CCPA, also exempt some data Processed in the context of clinical trials, these developments may further complicate compliance efforts, and may increase legal risk and compliance costs for us and the third parties upon whom we rely.

Outside the United States, an increasing number of laws, regulations, and industry standards may govern data privacy and security. For example, the European Union's General Data Protection Regulation (EU GDPR), the United Kingdom's GDPR (UK GDPR), Brazil's General Data Protection Law (Lei Geral de Proteção de Dados Pessoais, or LGPD) (Law No. 13,709/2018) and China's Personal Information Protection Law ("PIPL") impose strict requirements for Processing personal data. We may become subject to an increasing number of foreign privacy laws, particularly as we have begun to sponsor clinical trials in foreign jurisdictions, including in Europe. For example, failure to comply with the requirements of the EU and UK GDPR may result in warning letters, litigation, orders banning the Processing of personal data, mandatory audits and financial penalties, including fines of up to 4% of the total worldwide annual turnover, or €20,000,000 under the EU GDPR (17,500,000 British Pounds under the UK GDPR), in either case, whichever is greater; or private litigation related to Processing of personal data brought by classes of data subjects or consumer protection organizations authorized at law to represent their interests. Kyorin has also enrolled clinical trial patients in Japan and may be subject to local laws and regulations regarding data privacy, including Japan's Act on the Protection of Personal Information. As another

example, the LGPD broadly regulates Processing personal data of individuals in Brazil and imposes compliance obligations and penalties comparable to those of the EU GDPR.

In the ordinary course of business, we may transfer personal data from Europe and other jurisdictions to the United States or other countries. Europe and other jurisdictions have enacted laws requiring data to be localized or limiting the transfer of personal data to other countries. In particular, the EEA and the UK have significantly restricted the transfer of personal data to the United States and other countries whose privacy laws it generally believes are inadequate. Other jurisdictions may adopt similarly stringent interpretations of their data localization and cross-border data transfer laws. Although there are currently various mechanisms that may be used to transfer personal data from the EEA and UK to the United States in compliance with law, such as the EEA and UK's standard contractual clauses, the UK's International Data Transfer Agreement / Addendum, and the EU-U.S. Data Privacy Framework and the UK extension thereto (which allows for transfers for relevant U.S.-based organizations who self-certify compliance and participate in the Framework), these mechanisms are subject to legal challenges, and there is no assurance that we can satisfy or rely on these measures to lawfully transfer personal data to the United States. If there is no lawful manner for us to transfer personal data from the EEA, the UK, or other jurisdictions to the United States, or if the requirements for a legally-compliant transfer are too onerous, we could face significant adverse consequences, including the interruption or degradation of our operations, the need to relocate part of or all of our business or data processing activities to other jurisdictions (such as Europe) at significant expense, increased exposure to regulatory actions, substantial fines and penalties, the inability to transfer data and work with partners, vendors and other third parties, and injunctions against our processing or transferring of personal data necessary to operate our business. Additionally, companies that transfer personal data out of the EEA and UK to other jurisdictions, particularly to the United States, are subject to increased scrutiny from regulators, individual litigants, and activities groups. Some European regulators have ordered certain companies to suspend or permanently cease certain transfers of personal data out of Europe for allegedly violating the EU and UK GDPR's cross-border data transfer limitations.

Our employees and personnel use generative artificial intelligence (AI) technologies to perform their work, and the disclosure and use of personal data in generative AI technologies is subject to various privacy laws and other privacy obligations. Governments have passed and are likely to pass additional laws regulating generative AI. Our use of this technology could result in additional compliance costs, regulatory investigations and actions, and lawsuits. If we are unable to use generative AI, it could make our business less efficient and result in competitive disadvantages.

In addition to data privacy and security laws, we are contractually subject to industry standards adopted by industry groups and, we are, or may become subject to such obligations in the future. We are also bound by contractual obligations related to data privacy and security, and our efforts to comply with such obligations may not be successful. For example, certain privacy laws, such as the EU and UK GDPR and the CCPA, may require our customers to impose specific contractual restrictions on their service providers. We also publish privacy policies, marketing materials and other statements, such as compliance with certain certifications, regarding data privacy and security. If these policies, materials or statements are found to be deficient, lacking in transparency, deceptive, unfair, or misrepresentative of our practices, we may be subject to investigation, enforcement actions by regulators or other adverse consequences.

***Unfavorable macroeconomic conditions could adversely affect our business, financial condition or results of operations.***

Our results of operations could be adversely affected by general conditions in the global economy and in the global financial markets. For example, the global financial crisis caused volatility and disruptions in the capital and credit markets. In addition, due to general political and economic conditions, including global geopolitical tension, armed conflicts, liquidity concerns at, and failures of, banks and other financial institutions or other disruptions in the banking system or financing markets, higher interest rates and financial and credit market fluctuations, volatility in the capital markets, the global credit and financial markets have experienced extreme volatility and disruptions, including diminished liquidity and credit availability, declines in consumer confidence, declines in economic growth, volatility in unemployment rates, inflation and uncertainty about economic stability. A severe or prolonged economic downturn, such as the global financial crisis, could result in a variety of risks to our business, including inability to raise additional capital when needed on acceptable terms, if at all. A weak or declining economy could also strain our CDMOs and CROs, possibly resulting in supply disruption. Any of the foregoing could harm our business and we cannot anticipate all of the ways in which the current economic climate and financial market conditions could adversely impact our business.

***We or the third parties upon whom we depend may be adversely affected by earthquakes, droughts, floods, fires, hurricanes or other natural disasters and our business continuity and disaster recovery plans may not adequately protect us from a serious disaster.***

We are located in San Diego, California and our manufacturing activities are conducted by CDMOs and our clinical trials are conducted at various locations in the United States and abroad. Some of these geographic locations have in the past experienced natural disasters, including severe earthquakes. Earthquakes, droughts, floods, fires, hurricanes, disease epidemics or other natural disasters could severely disrupt our operations, and have a material adverse effect on our business, results of operations, financial condition and prospects. If a natural disaster, power outage or other event occurred that prevented us from using all or a significant portion of our facilities, that damaged critical infrastructure, such as the manufacturing facilities of our CDMOs and clinical sites utilized by our CROs, or that otherwise disrupted operations, it may be difficult or, in certain cases, impossible for us to continue our business for a substantial

period of time. The disaster recovery and business continuity plans we have in place currently are limited and are unlikely to prove adequate in the event of a serious disaster or similar event. We may incur substantial expenses as a result of the limited nature of our disaster recovery and business continuity plans, as well as limits on our insurance coverage, which could have a material adverse effect on our business, prospects, financial condition and results of operations.

**Risks related to the commercialization of our product candidates**

***If we are unable to establish sales, marketing and distribution capabilities or enter into agreements with third parties to market and sell our product candidates, we may be unable to generate any revenues.***

We do not currently have any infrastructure for the sales, marketing and distribution of pharmaceutical products. In order to market our product candidates, if approved by the FDA or any other regulatory body, we must build our sales, marketing, distribution, managerial and other non-technical capabilities or make arrangements with third parties to perform these services. There are risks involved with both establishing our own sales and marketing capabilities and entering into arrangements with third parties to perform these services. For example, recruiting and training a sales force is expensive and time consuming and could delay any product launch. If the commercial launch of a product candidate for which we recruit a sales force and establish marketing capabilities is delayed or does not occur for any reason, we would have prematurely or unnecessarily incurred these commercialization expenses. This may be costly, and our investment would be lost if we cannot retain or reposition our sales and marketing personnel.

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

***We rely on third-party manufacturers to produce our product candidates, but we have not entered into agreements with any such manufacturers to support commercialization.***

We have not yet secured manufacturing capabilities for commercial quantities of any of our product candidates. Although we intend to rely on third-party manufacturers for commercialization, we have not yet entered into a long-term commercial supply agreement to support full scale commercial production, and we or our CDMOs may be unable to process validation activities necessary to enter into commercial supply agreements or otherwise negotiate agreements with the manufacturers to support our commercialization activities at commercially reasonable terms.

We may run into technical or scientific issues related to development or manufacturing that we may be unable to resolve in a timely manner or with available funds. For example, we engaged an additional CDMO to manufacture efzofitimod bulk drug substance. If the new CDMO experiences delays in validating the manufacturing process, particularly delays in producing efzofitimod in compliance with cGMP regulations, we could be forced to delay future clinical trials or the submission of regulatory approval applications to the FDA. In addition, due to the fact that all prior cGMP batches of efzofitimod, including those that we intend to use in the EFZO-FIT study, have been produced by our existing CDMO, we will be required to complete comparability studies prior to using efzofitimod produced at the new CDMO's facilities in subsequent clinical trials or submitting regulatory approval applications to the FDA. If we are unable to demonstrate such comparability to the satisfaction of the FDA, it may result in delays to future clinical trials or a deficiency in future regulatory applications. If we or our CDMOs are unable to scale the manufacturing process to produce commercial quantities of our product candidates, or our CDMOs do not pass required regulatory pre-approval inspections, our commercialization efforts will be harmed.

In addition, any significant disruption in our relationships with our CDMOs could harm our business. There are a relatively small number of potential manufacturers for our product candidates, and such manufacturers may not be able to supply our drug products at the times we need them or on commercially reasonable terms. Any disruption to our relationship with our current CDMOs and any manufacturers that we contract with in the future will result in delays in our ability to complete the clinical development of, or to commercialize, our product candidates, and may require us to incur additional costs.

***We face intense competition and rapid technological change and the possibility that our competitors may develop therapies that are more advanced or effective than ours, which may adversely affect our financial condition and our ability to successfully commercialize our product candidates.***

The biotechnology and pharmaceutical industries are intensely competitive and subject to rapid and significant technological change. We have competitors both in the United States and internationally, including major multi-national pharmaceutical companies, biotechnology companies and universities and other research institutions. Although we believe we are the only company engaged in the

discovery and development of therapeutics based on novel functions of tRNA synthetases, we are aware of other companies that could compete with our product candidates in their target therapeutic indications, such as our lead candidate, efzofitimod, for the treatment of pulmonary sarcoidosis, SSc-ILD and other ILD.

Many of our competitors have substantially greater financial, technical and other resources, such as larger research and development staff and experienced marketing and manufacturing organizations. Competition may increase further as a result of advances in the commercial applicability of technologies and greater availability of capital for investment in these industries. Our competitors may succeed in developing, acquiring or licensing on an exclusive basis, products that are more effective, safer, more convenient or less costly than any product candidate that we may develop, or achieve earlier patent protection, regulatory approval, product commercialization and market penetration than us. Additionally, technologies developed by our competitors may render our potential product candidates uneconomical or obsolete, and we may not be successful in marketing our product candidates against competitors.

***The commercial success of any current product candidate or future product candidates will depend upon the degree of market acceptance by physicians, patients, third-party payors and others in the medical community.***

Even with the requisite approval from the FDA and comparable foreign regulatory authorities, the commercial success of our product candidates will depend in part on the medical community, patients, and third-party payors accepting our product candidates as medically useful, cost-effective, and safe. Any product that we bring to the market may not gain market acceptance by physicians, patients, third-party payors and others in the medical community. If these products do not achieve an adequate level of acceptance, we may not generate significant product revenue and may not become profitable.

Even if a potential product displays a favorable efficacy and safety profile in preclinical studies and clinical trials, market acceptance of the product will not be known until after it is launched. Our efforts to educate the medical community and third-party payors on the benefits of the product candidates may require significant resources and may never be successful. Such efforts to educate the marketplace may require more resources than are required by the conventional technologies marketed by our competitors, and our competitors may have substantially greater resources or brand recognition to effectively market their products. If our product candidates are approved but fail to achieve an adequate level of acceptance by physicians, patients, third-party payors, and others in the medical community, we will not be able to generate sufficient revenue to become or remain profitable.

***The insurance coverage and reimbursement status of newly-approved products is uncertain. Failure to obtain or maintain adequate coverage and reimbursement for new or current products could limit our ability to market those products and decrease our ability to generate revenue.***

The availability and extent of coverage and adequate reimbursement by third-party payors, including government health administration authorities, private health coverage insurers, managed care organizations and other third-party 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 such product candidates will be covered and reimbursed by 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.

There is significant uncertainty related to the insurance coverage and reimbursement of newly approved products. In the United States, the principal decisions about reimbursement for new medicines are typically made by the Centers for Medicare & Medicaid Services (CMS), as CMS decides whether and to what extent a new medicine will be covered and reimbursed under Medicare. Private payors often follow CMS with respect to coverage policy and payment limitations in setting their own reimbursement policies. It is difficult to predict what CMS will decide with respect to reimbursement for fundamentally novel products such as ours, as there is no body of established practices and precedents for these new products. One third-party payor's determination to provide coverage for a product candidate does not assure that other payors will also provide coverage for the product candidate. Further, no uniform policy for coverage and reimbursement exists in the United States, and coverage and reimbursement can differ significantly from payor to payor. 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 third-party payor separately, with no assurance that coverage and adequate reimbursement will be applied consistently or obtained in the first instance. Reimbursement agencies in Europe may be more conservative than third-party payors in the United States. For example, a number of cancer drugs have been approved for reimbursement in the United States, but have not been approved for reimbursement in certain European countries. There may be significant delays in obtaining reimbursement for newly approved medicines, and our inability to promptly obtain coverage and profitable payment rates from third-party payors for any approved medicines could have a material adverse effect on our business, prospects, financial condition and results of operations.

Outside the United States, international sales 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 our product candidates. In many countries, the prices of medical products are subject to varying price control mechanisms as part of national health systems. In general, the prices of medicines under such systems are substantially lower than in the United States. Other countries allow companies to fix their own prices for medicines, 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 revenues and profits. Net prices for medicines may be reduced by mandatory discounts or rebates required by government healthcare programs or private payors and by any future relaxation of laws that currently restrict imports of medicines from countries where they may be sold at lower prices than in the United States.

Moreover, increasing efforts by governmental and third-party payors, in the United States and abroad, to cap or reduce healthcare costs may cause such organizations to limit both coverage and level of reimbursement for new products and, as a result, they may not cover or provide adequate payment for our product candidates. For example, the Patient Protection and Affordable Care Act, as amended by the Health Care and Education Reconciliation Act of 2010 (collectively, the ACA) was passed in March 2010, and substantially changed the way healthcare is financed by both governmental and private insurers. There have been executive, judicial and congressional challenges to certain aspects of the ACA. While Congress has not passed comprehensive repeal legislation, it has enacted laws that modified certain provisions of the ACA such as removing penalties, starting January 1, 2019, for not complying with the ACA's individual mandate to carry health insurance. On June 17, 2021 the U.S. Supreme Court dismissed a challenge on procedural grounds that argued the ACA is unconstitutional in its entirety because the "individual mandate" was repealed by Congress. On August 16, 2022, President Biden signed the Inflation Reduction Act of 2022 (IRA) into law, which among other things, extends enhanced subsidies for individuals purchasing health insurance coverage in ACA marketplaces through plan year 2025. The IRA also eliminates the "donut hole" under the Medicare Part D program beginning in 2025 by significantly lowering the beneficiary maximum out-of-pocket cost and through a newly established manufacturer discount program. It is possible that the ACA will be subject to judicial or Congressional challenges in the future. It is unclear how any such challenges and the healthcare reform measures of the Biden administration will impact the ACA and our business.

In addition, there has been heightened governmental scrutiny in the United States of pharmaceutical pricing practices in light of the rising cost of prescription drugs and biologics. Such scrutiny has resulted in several recent presidential executive orders, congressional inquiries and proposed and enacted federal and state legislation designed to, among other things, bring more transparency to product pricing, review the relationship between pricing and manufacturer patient programs, and reform government program reimbursement methodologies for products. For example, in July 2021, the Biden administration released an executive order, "Promoting Competition in the American Economy," with multiple provisions aimed at prescription drugs. In response to Biden's executive order, on September 9, 2021, the U.S. Department of Health and Human Services (HHS) released a Comprehensive Plan for Addressing High Drug Prices that outlines principles for drug pricing reform and sets out a variety of potential legislative policies that Congress could pursue as well as potential administrative actions HHS can take to advance these principles. Further, the IRA, among other things, (1) directs the HHS to negotiate the price of certain single-source drugs and biologics covered under Medicare and (2) imposes rebates under Medicare Part B and Medicare Part D to penalize price increases that outpace inflation. These provisions take effect progressively starting in fiscal year 2023. On August 29, 2023, HHS announced the list of the first ten drugs that will be subject to price negotiations, although the Medicare drug price negotiation program is currently subject to legal challenges. HHS has and will continue to issue and update guidance as these programs are implemented. It is currently unclear how the IRA will be implemented but is likely to have a significant impact on the pharmaceutical industry. In addition, in response to the Biden administration's October 2022 executive order, on February 14, 2023, HHS released a report outlining three new models for testing by the Center for Medicare and Medicaid Innovation which will be evaluated on their ability to lower the cost of drugs, promote accessibility, and improve quality of care. It is unclear whether the models will be utilized in any health reform measures in the future. Further, on December 7, 2023, the Biden administration announced an initiative to control the price of prescription drugs through the use of march-in rights under the Bayh-Dole Act. On December 8, 2023, the National Institute of Standards and Technology published for comment a Draft Interagency Guidance Framework for Considering the Exercise of March-In Rights which for the first time includes the price of a product as one factor an agency can use when deciding to exercise march-in rights. While march-in rights have not previously been exercised, it is uncertain if that will continue under the new framework. We expect to experience pricing pressures in connection with the sale of any of our product candidates, due to the trend toward managed healthcare, the increasing influence of health maintenance organizations and additional health reform measures. The downward pressure on healthcare costs in general, particularly prescription drugs and surgical procedures and other treatments, has become very intense. As a result, increasingly higher barriers are being erected to the entry of new products.

In addition, drug prices are under significant scrutiny in the markets in which our products may be sold. Drug pricing and other health care costs continues to be subject to intense political and societal pressures which we anticipate will continue and escalate on a global basis. If coverage and reimbursement is available only to limited levels, we may not be able to successfully commercialize our product candidates for which we obtain marketing approval. As a result, we may have difficulty raising capital and our results of operations may be adversely impacted.

***Our business operations and current and future relationships with investigators, healthcare professionals, consultants, third-party payors and customers may be subject, directly or indirectly, to federal and state healthcare fraud and abuse laws, false claims laws, transparency laws, health information privacy and security laws and other healthcare laws and regulations. If we are unable to comply, or have not fully complied, with such laws, we could face substantial penalties.***

Although we do not currently have any products on the market, our current and future operations may be, directly or indirectly through our prescribers, customers and third-party payors, subject to various federal and state healthcare laws and regulations. The laws that may affect our ability to operate include:

- the federal Anti-Kickback Statute, which prohibits, among other things, persons or entities from knowingly and willfully soliciting, offering, receiving or paying any remuneration (including any kickback, bribe or certain rebates), directly or indirectly, overtly or covertly, in cash or in kind, to induce or reward either the referral of an individual for, or the purchase, lease, order or recommendation of, any good, facility, item or service, for which payment may be made, in whole or in part, under federal and state healthcare programs such as Medicare and Medicaid. A person or entity does not need to have actual knowledge of the statute or specific intent to violate it in order to have committed a violation;

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

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

- HIPAA, as amended by the Health Information Technology for Economic and Clinical Health Act (HITECH), which imposes certain obligations, including mandatory contractual terms, with respect to safeguarding the privacy, security and transmission of individually identifiable health information without appropriate authorization by covered entities, i.e. health plans, healthcare clearinghouses and certain healthcare providers, as well as their business associates and covered subcontractors that perform certain services for or on their behalf involving the use or disclosure of individually identifiable health information;

- the U.S. federal legislation commonly referred to as Physician Payments Sunshine Act, enacted as part of the ACA, and its implementing regulations, which requires certain manufacturers of drugs, devices, biologics and medical supplies that are reimbursable under Medicare, Medicaid or the Children's Health Insurance Program to report annually to the CMS information related to certain payments and other transfers of value to physicians (defined to include doctors, dentists, optometrists, podiatrists and chiropractors), certain other healthcare professionals (such as physician assistants and nurse practitioners), and teaching hospitals, as well as ownership and investment interests held by the physicians described above and their immediate family members; and

- analogous state and foreign laws and regulations.

If our operations are found to be in violation of any of the laws described above or any other governmental laws and regulations that may apply to us, we may be subject to significant penalties, including civil, criminal and administrative penalties, damages, fines, exclusion from government funded healthcare programs, such as Medicare and Medicaid, or similar programs in other countries or jurisdictions, disgorgement, imprisonment, contractual damages, reputational harm, diminished profits, additional reporting requirements and oversight if we become subject to a corporate integrity agreement or similar agreement to resolve allegations of non-compliance with these laws and the delay, reduction, termination or restructuring of our operations.

**Risks related to the ownership of our common stock**

***The market price of our common stock historically has been highly volatile and is likely to continue to be volatile, and you could lose all or part of your investment.***

The market price of our common stock has been volatile and could be subject to wide fluctuations in response to various factors, some of which are beyond our control. In addition to the factors discussed in this "Risk Factors" section and elsewhere in this Annual Report, these factors include:

- adverse results or delays in preclinical studies or clinical trials;
- manufacturing sufficient quantities of product candidates for use in clinical trials;
- the imposition of a clinical hold on our product candidates or our inability to cause the clinical hold to be lifted;
- any delay in filing an investigational new drug application (IND) or BLA for any of our product candidates and any adverse development or perceived adverse development with respect to the FDA's review of that IND or BLA;
- failure of our strategic partners to perform under our collaborations or early termination of collaborations;
- failure to successfully develop and commercialize our product candidates;
- limited market sizes and pricing for our product candidates;
- failure by us or our licensors to prosecute, maintain or enforce intellectual property rights covering our product candidates and processes;
- changes in laws or regulations applicable to current or future products;
- inability to obtain adequate product supply for our product candidates or the inability to do so at acceptable prices;
- adverse regulatory decisions;
- introduction of new products, services or technologies by our competitors;
- inability to obtain additional capital;
- failure to meet or exceed financial or operational projections we may provide to the public;
- failure to meet or exceed the financial or operational projections of the investment community;
- the perception of the biopharmaceutical industry by the public, politicians, legislatures, regulators and the investment community;
- significant acquisitions, strategic partnerships, joint ventures or capital commitments by us or our competitors;
- disputes or other developments relating to proprietary rights, including patents, litigation matters and our ability to obtain patent protection for our technologies;
- additions or departures of key scientific or management personnel;
- significant lawsuits, including patent or stockholder litigation;
- if securities or industry analysts issue an adverse or misleading opinion regarding our common stock;
- changes in the market valuations of similar companies;
- changes in the structure of healthcare payment systems;
- sales of our common stock by us or our stockholders in the future;
- a potential additional reverse stock split if we are unable to maintain a stock price above $1.00 per share of common stock;
- trading volume of our common stock; and
- general political and macroeconomic conditions, including global geopolitical tension, armed conflicts, potential future health pandemics, liquidity concerns at, and failures of, banks and other financial institutions or other disruptions in the banking system or financing markets, rising interest rates and financial and credit market fluctuations, volatility in the capital markets, and other geopolitical and macroeconomic conditions, including labor shortages, economic slowdowns, recessions, inflation and monetary supply shifts, rising interest rates and tightening of credit markets, and the resulting impacts on our business operations or financial condition.

In addition, companies trading in the stock market in general, and on the Nasdaq Capital Market and biotechnology companies in particular, have experienced extreme price and volume fluctuations, and we have in the past experienced volatility that has been unrelated or disproportionate to our operating performance. From January 1, 2023 through March 8, 2024 the closing price of our common stock has ranged between $1.11 and $2.57 per share. Broad market and industry factors may negatively affect the market price of our common stock, regardless of our actual operating performance.

***Our executive officers, directors, 5% holders and their affiliates currently own a significant percentage of our stock and will be able to exert significant control over matters submitted to stockholders for approval***.

As of March 8, 2024, based on the latest information available to us, our executive officers, directors, holders known by us to own 5% of our voting stock and their affiliates own approximately 38.5% of our voting stock. Therefore, our executive officers, directors, holders known by us to own 5% of our voting stock and their affiliates will have the ability to influence us through their ownership positions and may be able to determine all matters requiring stockholder approval. For example, these stockholders, acting together, may be able to control elections 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 believe are in your best interest as one of our stockholders.

***Future sales and issuances of equity securities could result in dilution to our stockholders, impose restrictions or limitations on our business and could cause our stock price to fall.***

We will need additional capital in the future to continue our planned operations, and we may seek additional funding through a combination of equity offerings, debt, grant funding, collaborations, strategic partnerships and/or licensing arrangements.

In February 2023, we completed an underwritten follow-on public offering of 23,125,000 shares of our common stock, including the partial exercise of the underwriters' option to purchase additional shares, at a price to the public of $2.25 per share. The total net proceeds from the offering were approximately $48.1 million, after deducting underwriting discounts, commissions and offering expenses payable by us.

In April 2022, we entered into an Open Market Sale Agreement[SM] with Jefferies LLC (Jefferies) implementing an "at-the-market" offering program, (the Jefferies ATM Offering Program) pursuant to which we may offer and sell, from time to time and at our option, up to an aggregate of $65.0 million of shares of our common stock through Jefferies, acting as sales agent. Jefferies is entitled to a fixed commission rate of up to 3.0% of the gross sales proceeds of shares sold under the Jefferies ATM Offering Program. During 2022, we sold an aggregate of 1,421,627 shares of common stock at a weighted-average price of $3.09 per share for net proceeds of approximately $4.0 million under the Jefferies ATM Offering Program. During the year ended December 31, 2023, we sold an aggregate of 10,530,795 shares of common stock at a weighted-average price of $1.82 per share for net proceeds of approximately $18.4 million under the Jefferies ATM Offering Program.

These financing activities may have an adverse effect on our stockholders' rights, the market price of our common stock and on our operations, and may require us to relinquish rights to some of our technologies, intellectual property or product candidates, issue additional equity or debt securities, or otherwise agree to terms unfavorable to us.

In addition, sales of a substantial number of shares of our common stock by our existing stockholders in the public market or the perception that these sales might occur, could depress the market price of our common stock and could impair our ability to raise capital through the sale of additional equity securities. Any sales of securities by these stockholders could have a material adverse effect on the trading price of our common stock, even if there is no relationship between such sales and the performance of our business.

We have also registered or plan to register all common stock that we may issue under our employee benefits plans as well as shares of common stock underlying options to purchase shares of our common stock that were granted as inducement grants. As a result, once registered, these shares can be freely sold in the public market upon issuance, subject to restrictions under the securities laws. In addition, our directors and executive officers may establish programmed selling plans under Rule 10b5-1 of the Securities Exchange Act of 1934 (Exchange Act) for the purpose of effecting sales of our common stock. If any of these events cause a large number of our shares to be sold in the public market, the sales could reduce the trading price of our common stock and impede our ability to raise future capital.

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

We have incurred substantial losses during our history, we do not expect to become profitable in the near future and we may never achieve profitability. Net operating loss carryforwards (NOLs) that expire unused will be unavailable to offset future income tax liabilities. Under current law, federal net operating losses incurred in tax years beginning after December 31, 2017, may be carried forward indefinitely, but the deductibility of such federal NOLs is limited to 80% of taxable income.

In addition, under Section 382 of the Internal Revenue Code of 1986, as amended (Code) a corporation that undergoes an "ownership change" (as defined under Section 382 of the Code and applicable Treasury Regulations) is subject to limitations on its ability to utilize its pre-change NOLs to offset post-change taxable income. We have experienced ownership changes in the past, and may experience future ownership changes, under Section 382 of the Code that could affect our ability to utilize our NOLs to offset our income. Furthermore, our ability to utilize NOLs of companies that we may acquire in the future may be subject to limitations. There is also a risk that due to regulatory changes, such as suspensions on the use of NOLs or other unforeseen reasons, portions of our existing NOLs could expire or otherwise be unavailable to reduce future income tax liabilities, including for state tax purposes. For these reasons, we may not be able to utilize a material portion of our NOLs, even if we attain profitability, which could potentially result in increased future tax liability to us and could adversely affect our operating results and financial condition.

***Uncertainties in the interpretation and application of existing, new and proposed tax laws and regulations could materially affect our tax obligations and effective tax rate.***

The tax regimes to which we are subject or under which we operate are unsettled and may be subject to significant change. The issuance of additional guidance related to existing or future tax laws, or changes to tax laws or regulations proposed or implemented by the current or a future U.S. presidential administration, Congress, or taxing authorities in other jurisdictions, including jurisdictions outside of the United States, could materially affect our tax obligations and effective tax rate. To the extent that such changes have a negative impact on us, including as a result of related uncertainty, these changes may adversely impact our business, financial condition, results of operations, and cash flows.

The amount of taxes we pay in different jurisdictions depends on the application of the tax laws of various jurisdictions, including the United States, to our international business activities, tax rates, new or revised tax laws, or interpretations of tax laws and policies, and our ability to operate our business in a manner consistent with our corporate structure and intercompany arrangements. The taxing authorities of the jurisdictions in which we operate may challenge our methodologies for pricing intercompany transactions pursuant to our intercompany arrangements or disagree with our determinations as to the income and expenses attributable to specific jurisdictions. If such a challenge or disagreement were to occur, and our position was not sustained, we could be required to pay additional taxes, interest, and penalties, which could result in one-time tax charges, higher effective tax rates, reduced cash flows, and lower overall profitability of our operations. Our financial statements could fail to reflect adequate reserves to cover such a contingency. Similarly, a taxing authority could assert that we are subject to tax in a jurisdiction where we believe we have not established a taxable connection, often referred to as a "permanent establishment" under international tax treaties, and such an assertion, if successful, could increase our expected tax liability in one or more jurisdictions.

***We do not intend to pay dividends on our common stock, and therefore 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 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 the appreciation of their stock.

In addition, future debt instruments may materially restrict our ability to pay dividends on our common stock. Any future determination related to dividend policy will be made at the discretion of our board of directors and will depend upon, among other factors, our results of operations, financial condition, capital requirements, tax considerations, legal or contractual restrictions, business prospects, the requirements of current or then-existing debt instruments, general economic conditions and other factors our board of directors may deem relevant.

***Provisions in our amended and restated certificate of incorporation and amended and restated bylaws, as well as provisions of Delaware law, could make it more difficult for a third party to remove our current management, acquire us or increase the cost of acquiring us, even if doing so would benefit our stockholders.***

Our amended and restated certificate of incorporation, amended and restated bylaws and Delaware law contain provisions that may have the effect of delaying or preventing a change in control of us or changes in our management. Our amended and restated certificate of incorporation and amended and restated bylaws include provisions that:

- authorize "blank check" preferred stock, which could be issued by our board of directors without stockholder approval and may contain voting, liquidation, dividend and other rights superior to our common stock;
- create a classified board of directors whose members serve staggered three-year terms;
- specify that special meetings of our stockholders can be called only by our board of directors, the chairperson of our board of directors, our chief executive officer or our president;
- prohibit stockholder action by written consent;

- establish an advance notice procedure for stockholder approvals to be brought before an annual meeting of our stockholders, including proposed nominations of persons for election to our board of directors;
- provide that our directors may be removed only for cause;
- provide that vacancies on our board of directors may be filled only by a majority of directors then in office, even though less than a quorum;
- specify that no stockholder is permitted to cumulate votes at any election of directors;
- expressly authorize our board of directors to modify, alter or repeal our amended and restated bylaws; and
- require supermajority votes of the holders of our common stock to amend specified provisions of our amended and restated certificate of incorporation and amended and restated bylaws.

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

In addition, because we are incorporated in Delaware, we are governed by the provisions of Section 203 of the Delaware General Corporation Law, which limits the ability of stockholders owning in excess of 15% of our outstanding voting stock to merge or combine with us.

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

***Our amended and restated bylaws provide that the Court of Chancery of the State of Delaware is the exclusive forum for certain 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 bylaws provide that the Court of Chancery of the State of Delaware will be the sole and exclusive forum for (i) any derivative action or proceeding brought on our behalf, (ii) any action asserting a claim of breach of a fiduciary duty owed by any of our directors, officers or employees to our company or our stockholders, (iii) any action asserting a claim against our company arising pursuant to any provision of the Delaware General Corporation Law or our amended and restated certificate of incorporation or bylaws, or (iv) any action asserting a claim against our company governed by the internal affairs doctrine. This choice of forum provision does not apply to suits brought to enforce a duty or liability created by the Securities Act of 1933, as amended (Securities Act) or the Exchange Act, or any other claim for which the federal courts have exclusive jurisdiction.

This choice of forum provision may limit a stockholder's ability to bring certain claims in a judicial forum that it finds favorable for disputes with us or any of our directors, officers, other employees or stockholders, which may discourage lawsuits with respect to such claims, although our stockholders will not be deemed to have waived our compliance with federal securities laws and the rules and regulations thereunder. If a court were to find this choice of forum provision to be inapplicable or unenforceable in an action, we may incur additional costs associated with resolving such action in other jurisdictions, which could adversely affect our business and financial condition.

**General Risk Factors**

***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 the success of 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 or other work-related injuries, this insurance may not provide adequate coverage against potential liabilities. 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 production efforts. Failure to comply with these laws and regulations also may result in substantial fines, penalties or other sanctions.

***If our information technology systems or data, or those maintained on our behalf, are or were compromised, this could result in a Material Adverse Impact.***

In the ordinary course of our business, we and the third-parties upon which we rely Process (as defined above) proprietary, confidential and sensitive information, including personal data (including key-coded data, health information and other special categories of personal data), intellectual property, trade secrets, and proprietary business information owned or controlled by ourselves or other third parties (collectively, Sensitive Information).

We and our third-party service providers utilize information technology systems to Process Sensitive Information in connection with our business activities, and we face a variety of evolving threats that could cause security incidents.

Cyber-attacks, malicious internet-based activity, online and offline fraud, and other similar activities threaten the confidentiality, integrity and availability of our Sensitive Information and information technology systems, and those of the third parties upon which we rely. Such threats are prevalent, continue to rise, are increasingly difficult to detect and come from a variety of sources, including traditional computer "hackers," threat actors, "hacktivists," organized criminal threat actors, personnel (such as through theft or misuse), sophisticated nation states, and nation state supported actors. Some actors now engage and are expected to continue to engage in cyber-attacks, including without limitation nation state actors for geopolitical reasons and in conjunction with military conflicts and defense activities. During times of war and other major conflicts, we and the third parties upon which we rely may be vulnerable to a heightened risk of these attacks, including retaliatory cyber-attacks, that could materially disrupt our systems and operations, supply chain, and ability to conduct our business.

We and the third parties upon which we rely are subject to a variety of evolving threats, including but not limited to software bugs; malicious code (such as viruses and worms); denial-of-service attacks; credential stuffing; credential harvesting; malware (including as a result of advanced persistent threat intrusions; natural disasters; terrorism; war; telecommunication and electrical failures; ransomware attacks; social-engineering attacks (including through deep fakes, which may be increasingly more difficult to identify as fake, and phishing attacks); server malfunctions; software or hardware failures; supply-chain attacks; loss of data or other computer assets; attacks enhanced or facilitated by AI; and other similar issues. Particularly, severe ransomware attacks are becoming increasingly prevalent and can lead to significant interruptions, delays, or outages in our operations, disruption of clinical trials, loss of data (including data related to clinical trials), and other Material Adverse Impacts (as defined above). To alleviate the financial, operational and reputational impact of a ransomware attack, it may be preferable to make extortion payments, but we may be unwilling or unable to do so (including, for example, if applicable laws or regulations prohibit such payments).

Additionally, remote work has become more common and has increased the risk to our information technology assets and data, as more of our employees utilize network connections, computers and devices outside of our premises and networks, including working at home, while in transit and public locations. Additionally, future or past business transactions (such as acquisitions or integrations) could expose us to additional cybersecurity risks and vulnerabilities, as our systems could be negatively affected by vulnerabilities present in acquired or integrated entities' systems and technologies. Furthermore, we may discover security issues that were not found during due diligence of such acquired or integrated entities, and it may be difficult to integrate companies into our information technology environment and security program.

We use third-party service providers and subprocessors to help us operate our business and engage in Processing on our behalf or otherwise share Sensitive Information with our partners or other third parties in conjunction with our business. These third party service providers and technologies operate critical business systems to Process Sensitive Information in a variety of contexts, including, without limitation, cloud-based infrastructure, data center facilities, encryption and authentication technology, employee email, and other functions. Our ability to monitor these third parties' information security practices is limited, and these third parties may not have adequate information security measures in place. If our third-party service providers experience a security incident or other interruption, we could experience Material Adverse Impacts. While we may be entitled to damages if our third-party service providers fail to satisfy their privacy or security-related obligations to us, any award may be insufficient to cover our damages, or we may be unable to recover such award. Similarly, supply chain attacks have increased in frequency and severity, and we cannot guarantee that third parties' infrastructure in our supply chain or our third-party partners' supply chains have not been compromised.

Any of the previously identified or similar threats could cause a security incident or other interruption that could result in unauthorized, unlawful, or accidental acquisition, modification, destruction, loss, alteration, encryption, disclosure of, or access to our Sensitive Information or our information technology systems, or those of the third parties upon whom we rely. A security incident or other interruption could disrupt our ability (and that of third parties upon whom we rely) to provide our services.

We may expend significant resources, fundamentally change our business activities and practices, or modify our operations, including our clinical trial activities, or information technology in an effort to protect against security incidents and to mitigate, detect, and remediate actual and potential vulnerabilities. Applicable Data Protection Requirements (as defined above) may require us to implement specific security measures or use industry-standard or reasonable measures to protect against security incidents.

While we have implemented security measures designed to protect against security incidents, there can be no assurance that we, or any third-party partner, will be successful in preventing a security incident or mitigating their effects. We take steps designed to detect, mitigate and remediate vulnerabilities in our information technology systems, but we may not be able to detect and remediate all vulnerabilities because the threats and techniques used to exploit the vulnerability change frequently and are often sophisticated in nature. Therefore, such vulnerabilities could be exploited but may not be detected until after a security incident has occurred. Unremediated high risk or critical vulnerabilities pose material risk to our business. Further, we may experience delays in developing and deploying remedial measures designed to address any such identified vulnerabilities.

Furthermore, applicable Data Protection Requirements may require us to notify relevant stakeholders of security incidents. Such disclosures are costly, and the disclosures or the failure to comply with such requirements could lead to Material Adverse Impacts.

If we or the third parties upon which we rely experience or in the future experience (or are perceived to have experienced) any security incident(s), we could suffer reputational harm, face litigation or adverse regulatory actions, fines, other penalties, audits, inspections, additional reporting requirements and/or oversight, restrictions on Processing Sensitive Information, indemnification obligations, negative publicity, business interruptions, and diversion of funds. For example, the loss of data from completed clinical trials for our product candidates could result in delays in our regulatory approval efforts and significantly increase our costs. As a result, we could experience Material Adverse Impacts.

Our contracts may not contain limitations of liability, and even where they do, there can be no assurance that limitations of liability in our contracts are sufficient to protect us from liabilities, damages, or claims related to our data privacy and security obligations. Furthermore, we cannot be sure that our insurance coverage, will be adequate or otherwise protect us from or adequately mitigate liabilities or damages with respect to claims, costs, expenses, litigation, fines, penalties, business loss, data loss, regulatory actions or Material Adverse Impacts arising out of our Processing operations, data privacy and security practices, or security incidents we may experience. The successful assertion of one or more large claims against us that exceeds our available insurance coverage, or results in changes to our insurance policies (including premium increases or the imposition of large excess or deductible or co-insurance requirements), could have a Material Adverse Impact.

In addition to experiencing a security incident, third parties may gather, collect, or infer Sensitive Information about us from public sources, data brokers, or other means that reveals competitively sensitive details about our organization and could be used to undermine our competitive advantage or market position. Additionally, Sensitive Information of the Company could be leaked, disclosed, or revealed as a result of or in connection with our employees', personnel's, or vendors' use of generative AI technologies.

***We are subject to anti-corruption laws in the jurisdictions in which we operate.***

We are subject to a number of anti-corruption laws, including the Foreign Corrupt Practices Act of 1977, as amended (FCPA), and various other anti-corruption laws. The FCPA generally prohibits companies and their intermediaries from making improper payments to foreign officials for the purpose of obtaining or keeping business and/or other benefits. Our business relies on approvals and licenses from government and regulatory entities, and as a result, we are subject to certain elevated risks associated with interactions with these entities. Although we have adopted a code of business conduct and ethics that includes provisions governing the interactions of employees with government entities to mitigate these risks, there can be no assurance that this will be successful in preventing violations of anti-corruption laws. If we are not in compliance with anti-corruption laws and other laws governing the conduct of business with government entities (including local laws), we may be subject to criminal and civil penalties and other remedial measures, which could harm our reputation and have a material adverse effect on our business, financial condition, results of operations and prospects. Any investigation of any actual or alleged violations of such laws could also harm our reputation or have an adverse impact on our business, prospects, financial condition and results of operations.

***We have incurred and will continue to incur significant costs as a result of operating as a public company, and our management will be required to devote substantial time to new compliance initiatives.***

As a public company, we have incurred and will continue to incur legal, accounting and other expenses. In addition, the Sarbanes-Oxley Act of 2002 as well as rules subsequently implemented by the SEC and The Nasdaq Stock Market have imposed various requirements on public companies. In July 2010, the Dodd-Frank Wall Street Reform and Consumer Protection Act (the Dodd-Frank Act) was enacted. There are significant corporate governance and executive compensation related provisions in the Dodd-Frank Act that require the SEC to adopt additional rules and regulations in these areas such as "say on pay" and proxy access. Stockholder activism, the current political environment and the current high level of government intervention and regulatory reform may lead to substantial

new regulations and disclosure obligations, which may lead to additional compliance costs and impact the manner in which we operate our business in ways we cannot currently anticipate. Our management and other personnel devote a substantial amount of time to these compliance initiatives. Moreover, these rules and regulations increase our legal and financial compliance costs and make some activities more time-consuming and costly. For example, these rules and regulations make it more difficult and more expensive for us to maintain director and officer liability insurance and we have been required to incur substantial costs to maintain our current levels of such coverage.

***If securities analysts do not publish research or reports about our business or if they publish negative evaluations of our stock, the price of our stock could decline.***

The trading market for our common stock relies in part on the research and reports that industry or financial analysts publish about us or our business. If no or few analysts commence coverage or continue coverage of us, the trading price of our stock would likely decrease. If one or more of the analysts covering our business downgrade their evaluations of our stock, the price of our stock could decline. If one or more of these analysts cease to cover our stock, we could lose visibility in the market for our stock, which in turn could cause our stock price to decline.

***We could be subject to securities class action litigation.***

In the past, securities class action litigation has often been brought against companies following a decline in the market price of their securities. This risk is especially relevant for us because pharmaceutical companies have experienced significant stock price volatility. If we face such litigation, it could result in substantial costs and a diversion of management's attention and resources, which could harm our business and cause our stock price to decline.

***We have broad discretion in the use of our cash, cash equivalents, restricted cash and available-for-sale investments and are exposed to risks related to the marketable securities we may purchase.***

We have considerable discretion in the application of our existing cash, cash equivalents, restricted cash and available-for-sale investments. We expect to use our existing cash to fund research and development activities and for working capital and general corporate purposes, including funding the costs of operating as a public company. In addition, pending their use, we may invest our existing cash in certain short-term investments, including but not limited to investment-grade, interest-bearing securities. Historically, investment in these securities has been highly liquid and has experienced only very limited defaults. However, volatility in the financial markets in recent years has created additional uncertainty regarding the liquidity and safety of these investments. Additionally, we may use this cash, cash equivalents, restricted cash and available-for-sale investments for purposes that do not yield a significant return or any return at all for our stockholders.

**Item 1B. Unresolved Staff Comments.**

Not applicable.

**Item 1C. Cybersecurity.**

***Risk management and strategy***

We have implemented and maintain various information security processes designed to identify, assess and manage material risks from cybersecurity threats to our critical computer networks, third party hosted services, communications systems, hardware and software, and our critical data, including intellectual property, data associated with our clinical trials or manufacturing campaigns, and other confidential information that is proprietary, strategic or competitive in nature. We perform periodic assessments of our information security processes, and the results of these assessments are reported to the audit committee of the board of directors (Audit Committee) as part of a cybersecurity update report conducted at least annually.

We also engage vendors from time to time to assist with enterprise managed detection and response, security information and event management, and enterprise vulnerability management. These vendors also assist us from time to time in identifying, assessing and managing material risks from cybersecurity threats. The vendors include threat intelligence service providers, cybersecurity software providers and managed cybersecurity service providers.

We have adopted an Incident Response Management Procedure (Procedure) designed to help us respond to cybersecurity incidents and mitigate our risks and impacts. An incident response team is responsible for carrying out the Procedure and is led by our Information & Technology (IT) department, and includes members from our legal and compliance, finance, and human resource departments (Security Management Team). We also manage and maintain business continuity and disaster recovery capabilities to help ensure the availability of business-critical technology resources during adverse conditions.

Our assessment and management of material risks from cybersecurity threats are integrated into our overall risk management process. In addition, we have implemented a cybersecurity third party risk management process designed to assess the cybersecurity practices and monitor certain critical third parties, and to assist the business in making risk-informed technology services decisions. Our practice is to perform due diligence on certain third parties who maintain Sensitive Information, including CROs that manage and administer our clinical trials, and our CDMOs that manufacture our drug product to be used in clinical trials. Additionally, we monitor these third parties through frequent program management meetings as well as joint steering committee meetings in certain cases.

For a description of the risks from cybersecurity threats that may materially affect us and how those threats may do so, see our risk factors under Part 1. Item 1A. “Risk Factors - If our information technology systems or data, or those maintained on our behalf, are or were compromised, this could result in a Material Adverse Impact.”

***Governance***

Our board of directors addresses our cybersecurity risk management as part of its general oversight function. The Audit Committee is responsible for reviewing, assessing and considering the overall risk management policies and procedures, including our cybersecurity risk management processes, and oversight of mitigation of risks from cybersecurity threats.

Our Security Management Team is responsible for day-to-day management of cybersecurity risk, including hiring appropriate personnel, helping to integrate cybersecurity risk considerations into our overall risk management strategy, communicating key priorities to relevant personnel, approving budgets, helping prepare for cybersecurity incidents, approving cybersecurity processes, and reviewing security assessments and other security-related reports. Our cybersecurity risk assessment and management processes are implemented and maintained by the Security Management Team. Our Security Management Team includes our CFO who has more than 15 years of experience in managing IT departments, and certain members of our IT department who have over 25 years of experience in cybersecurity, information security, data protection, privacy, regulatory compliance and risk management.

Our cybersecurity incident response and vulnerability management policies are designed to escalate certain cybersecurity incidents to members of management depending on the circumstances, including our CFO, CEO and other members of our executive leadership team (ELT). Our CFO, CEO and ELT work with our Security Management Team to help us mitigate and remediate cybersecurity incidents of which they are notified. In addition, our incident response and vulnerability management policies include reporting to the Audit Committee for certain cybersecurity incidents.

The Audit Committee receives annual reports from the Security Management Team concerning our significant cybersecurity threats and risk and the processes we have implemented to address them. The Audit Committee also receives various reports, summaries or presentations related to cybersecurity threats, risk and mitigation.

**Item 2. Properties.**

In May 2022, we entered into a lease (the Lease) with San Diego Creekside, LLC (Landlord), as lessor, pursuant to which we agreed to lease from Landlord approximately 23,696 rentable square feet (subject to increase pursuant to the terms of the Lease) of office and laboratory space located at 10240 Sorrento Valley Road, Suite #300, San Diego, California. The Lease expires in July 2033 (subject to extension pursuant to the terms of the Lease). This facility serves as our corporate headquarters. We believe that this facility is sufficient to meet our needs and that suitable additional space will be available as and when needed.

**Item 3. Legal Proceedings.**

We are not a party to any material legal proceedings at this time. From time to time, we may be subject to various legal proceedings and claims that arise in the ordinary course of our business activities. Although the results of litigation and claims cannot be predicted with certainty, we do not believe we are party to any claim or litigation the outcome of which, if determined adversely to us, would individually or in the aggregate be reasonably expected to have a material adverse effect on our results of operations or financial condition. Regardless of the outcome, litigation can have an adverse effect on us because of defense and settlement costs, diversion of management resources and other factors.

**Item 4. Mine Safety Disclosures.**

Not applicable.

## PART II

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

**Market Information**

Our common stock is traded on the Nasdaq Capital Market under the symbol "LIFE."

**Holders of Record**

As of March 8, 2024, there were approximately 31 holders of record of our common stock. The approximate number of holders is based upon the actual number of holders registered in our records at such date and excludes holders in "street name" or persons, partnerships, associations, corporations, or other entities identified in security positions listings maintained by depository trust companies.

**Dividend Policy**

We have never declared or paid any cash dividends on our common stock. We currently intend to retain all available funds and any future earnings to support our operations and finance the growth and development of our business. We do not intend to pay cash dividends on our common stock for the foreseeable future. Any future determination related to our dividend policy will be made at the discretion of our board of directors and will depend upon, among other factors, our results of operations, financial condition, capital requirements, tax considerations, legal or contractual restrictions, business prospects, the requirements of current or then-existing debt instruments, general economic conditions and other factors our board of directors may deem relevant.

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

Information about our equity compensation plans is incorporated herein by reference to Part III, Item 12, under the section entitled "Security Ownership of Certain Beneficial Owners and Management and Related Stockholder Matters."

**Recent Sales of Unregistered Securities**

During the year ended December 31, 2023, we did not issue or sell any unregistered securities not previously disclosed in a Quarterly Report on Form 10-Q or in a Current Report on Form 8-K.

**Issuer Purchases of Equity Securities**

We did not repurchase any securities during the three months ended December 31, 2023.

### 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 together with the consolidated financial statements and related notes included elsewhere in this Annual Report on Form 10-K (Annual Report). The following discussion contains forward-looking statements that involve risks and uncertainties. Our actual results could differ materially from those expressed or implied in any forward-looking statements as a result of various factors, including those set forth under the caption "Part I, Item 1A. Risk Factors."*

**Overview**

We are a clinical stage biotechnology company leveraging evolutionary intelligence to translate tRNA synthetase biology into new therapies for fibrosis and inflammation. tRNA synthetases are ancient, essential proteins that have evolved novel domains that regulate diverse pathways extracellularly in humans. Our discovery platform is focused on unlocking hidden therapeutic intervention points by uncovering signaling pathways driven by our proprietary library of domains derived from all 20 tRNA synthetases.

*Efzofitimod*

Our lead therapeutic candidate is efzofitimod, a first-in-class biologic immunomodulator in clinical development for the treatment of interstitial lung disease (ILD), a group of immune-mediated disorders that can cause inflammation and fibrosis, or scarring, of the lungs. Efzofitimod is a tRNA synthetase derived therapy that selectively modulates activated myeloid cells through neuropilin-2 (NRP2) to resolve aberrant inflammation without immune suppression and potentially prevent the progression of fibrosis. ILDs are predominantly immune-mediated disorders that are characterized by chronic inflammation, which can lead to progressive fibrosis of the lung. There are limited treatment options for ILD and there remains a high unmet medical need. Sarcoidosis and systemic sclerosis (SSc, also known as scleroderma)-associated ILD (SSc-ILD) are two major forms of ILD. The U.S. Food and Drug Administration (FDA) has

granted efzofitimod orphan drug designations for the treatment of sarcoidosis and for the treatment of SSc, and Fast Track designations for the treatment of pulmonary sarcoidosis and for the treatment of SSc-ILD. The European Commission (EC) has granted efzofitimod orphan drug designations for the treatment of sarcoidosis and for the treatment of SSc, based on the opinion of the European Medicines Agency (EMA) Committee for Orphan Medicinal Products (COMP).

In September 2021, we announced positive results and clinical proof-of-concept from a double-blind, placebo-controlled Phase 1b/2a clinical trial in 37 patients with pulmonary sarcoidosis. The study was designed to evaluate the safety, tolerability, immunogenicity and preliminary efficacy of three doses of intravenous (IV) efzofitimod, 1.0, 3.0 and 5.0 mg/kg, in the context of a forced steroid taper. Efzofitimod was safe and well-tolerated at all doses administered with no serious drug-related adverse events or signal of immunogenicity. Additionally, the study demonstrated consistent dose response for efzofitimod on key efficacy endpoints and improvements compared to placebo, including measures of steroid reduction, lung function, pulmonary sarcoidosis symptom measures and inflammatory biomarkers. These data were subsequently presented at the American Thoracic Society (ATS) International Conference and published in the peer-reviewed journal *CHEST* during 2022.

In February 2022, we met with the FDA in an end-of-Phase 2 meeting to discuss our plans for subsequent clinical development and path to registration for efzofitimod for pulmonary sarcoidosis. Subsequently, we initiated a global pivotal Phase 3 randomized, double-blind, placebo-controlled clinical trial to evaluate the efficacy and safety of efzofitimod in patients with pulmonary sarcoidosis (the EFZO-FIT study). The EFZO-FIT study is a 52-week study consisting of three parallel cohorts randomized equally to either 3.0 mg/kg or 5.0 mg/kg of efzofitimod or placebo dosed intravenously once a month for a total of 12 doses. The study is currently enrolling and intends to enroll up to 264 subjects with pulmonary sarcoidosis at multiple centers in the United States, Europe, Brazil, and Japan. The study design incorporates a forced steroid taper. The objective of the study is to evaluate the efficacy and safety of efzofitimod in patients with pulmonary sarcoidosis. The primary endpoint of the study is steroid reduction. Secondary endpoints include measures of lung function assessed by forced vital capacity (FVC) and health-related quality of life assessments and questionnaires (KSQ lung score). In September 2022, we dosed the first patient in this study. Additionally, during 2023, we had a data and safety monitoring board (DSMB) review of our EFZO-FIT study. The DSMB concluded that the study could continue unmodified. We expect to complete enrollment in the study in the second quarter of 2024.

In February 2024, we announced an Individual Patient Expanded Access Program (EAP). The Individual Patient EAP has been initiated based on blinded EFZO-FIT™ study investigator and patient participant feedback. The program is designed to allow access for patients who complete the Phase 3 EFZO-FIT™ study and wish to receive treatment with efzofitimod outside of the clinical trial. The administration of efzofitimod as part of the Individual Patient EAP will occur independent of the EFZO-FIT study protocol, and we, principal investigators and patients will remain blinded to the treatment that occurred as part of the EFZO-FIT study. As this Individual Patient EAP will occur independent of the EFZO-FIT study, this program is not an open-label extension (OLE) and no long-term data will be collected by us.

Based on the results of the Phase 1b/2a clinical trial, we believe efzofitimod has potential applications in the treatment of other ILDs, such as chronic hypersensitivity pneumonitis (CHP) and connective tissue disease related ILD (CTD-ILD), including SSc-ILD and rheumatoid arthritis-associated ILD. As such, we designed a focused Phase 2 proof-of-concept clinical trial of efzofitimod (the EFZO-CONNECT study) in patients with SSc-ILD. The EFZO-CONNECT study is a randomized, double-blind placebo-controlled proof-of-concept study to evaluate the efficacy, safety and tolerability of efzofitimod in patients with SSc-ILD. This is a 28-week study with three parallel cohorts randomized 2:2:1 to either 270 mg or 450 mg of efzofitimod or placebo dosed intravenously monthly for a total of six doses. The study intends to enroll up to 25 patients at multiple centers in the United States. The objective of the study is to evaluate the efficacy of multiple doses of IV efzofitimod on pulmonary, cutaneous and systemic manifestations in patients with SSc-ILD. The primary endpoint is reduction in FVC. Secondary endpoints include certain measures regarding safety and tolerability. The study was initiated in the third quarter of 2023, and in October 2023, we dosed the first patient in this study.

In January 2020, we entered into a collaboration and license agreement (Kyorin Agreement) with Kyorin Pharmaceutical Co., Ltd. (Kyorin) for the development and commercialization of efzofitimod for the treatment of ILD in Japan. Under the Kyorin Agreement, Kyorin received an exclusive right to develop and commercialize efzofitimod in Japan for all forms of ILD, and is obligated to fund all research, development, regulatory, marketing and commercialization activities in Japan. In 2020, Kyorin conducted and funded a Phase 1 clinical trial of efzofitimod (known as KRP-R120 in Japan). The Phase 1 clinical trial was a placebo-controlled clinical trial to evaluate the safety, pharmacokinetics (PK) and immunogenicity of efzofitimod in 32 healthy Japanese male volunteers. Efzofitimod was observed to be generally well-tolerated with no drug-related serious adverse events, and PK findings were consistent with previous studies of efzofitimod. Kyorin is also participating in the EFZO-FIT study as the local sponsor in Japan. In February 2023, Kyorin dosed the first patient in Japan in the EFZO-FIT study which triggered a $10.0 million milestone payment to us. To date, the Kyorin Agreement has generated $20.0 million in upfront and milestone payments to us and we are eligible to receive up to an additional $155.0 million in the aggregate upon achievement of certain development, regulatory and sales milestones, as well as tiered royalties on any net sales in Japan.

*Discovery Platform*

Using efzofitimod as a model, we have developed a process to advance novel tRNA synthetase domains from a concept to therapeutic candidate. This process leverages our early discovery work as well as current scientific understanding of tRNA synthetase evolution, protein structure, gene splicing and tissue-specific regulation to identify potentially active protein domains. Screening approaches are employed to identify target cells and extracellular receptors for these tRNA synthetase-derived proteins. These cellular systems can then be used in mechanism-of-action studies to elucidate the role these proteins play in cellular responses and their potential therapeutic utility. We are working to identify new tRNA synthetase based drug candidates through our internal discovery efforts and external collaboration efforts.

*Impact of Geopolitical and Macroeconomic Conditions*

Global economic and business activities continue to face widespread macroeconomic uncertainties, including global geopolitical tension, armed conflicts, labor shortages, inflation and monetary supply shifts, liquidity concerns at, and failures of, banks and other financial institutions or other disruptions in the banking system or financing markets, higher interest rates and financial and credit market fluctuations, volatility in the capital markets and recession risks, which has resulted in further volatility in the U.S. and global financial markets and which has led to, and may continue to lead to, additional disruptions to trade, commerce, pricing stability, credit availability and supply chain continuity globally. The ultimate long-term impact of these evolving geopolitical and macroeconomic conditions on our business is uncertain, although we continue to actively monitor the impact of these factors on our results of operations, financial condition and cash flows. The extent of the impact of these factors on our operational and financial performance, including our ability to execute our business strategies and initiatives in the expected timeframe, will depend on future developments, which are uncertain and cannot be predicted; however, any continued or renewed disruption resulting from these factors could negatively impact our business.

**Liquidity and Capital Resources**

We have incurred losses and negative cash flows from operations since our inception. As of December 31, 2023, we had an accumulated deficit of $468.0 million, and we expect to continue to incur net losses for the foreseeable future. As of December 31, 2023, we had cash, cash equivalents, restricted cash and available-for-sale investments of $101.7 million. We believe that our current cash, cash equivalents, restricted cash and available-for-sale investments, will be sufficient to meet our material cash requirements from known contractual and other obligations for a period of at least one year from the date of this Annual Report. In addition to the factors discussed under “Material Cash Requirements,” our ability to fund our longer-term operating needs will depend on our ability to raise additional funding through equity or debt offerings, grant funding, collaborations, strategic partnerships and/or licensing arrangements, and other factors, including those discussed in Part I, Item 1A. “Risk Factors - Risks related to our financial condition and need for additional capital—We will need to raise additional capital or enter into strategic partnering relationships to fund our operations.”

***Sources of Cash***

From our inception through December 31, 2023, we have financed our operations primarily through the sale of equity securities and convertible debt, venture debt, term loans and through license and collaboration agreement revenues.

*Public Offerings*

In February 2023, we completed an underwritten follow-on public offering of 23,125,000 shares of our common stock, including the partial exercise of the underwriters’ option to purchase additional shares, at a price to the public of $2.25 per share. The total net proceeds from the offering were approximately $48.1 million, after deducting underwriting discounts, commissions and offering expenses payable by us.

In September 2021, we completed an underwritten follow-on public offering of 10,781,250 shares of our common stock, including the full exercise of the underwriters’ option to purchase additional shares, at a price to the public of $8.00 per share. The total net proceeds from the offering were approximately $80.6 million, after deducting underwriting discounts, commissions and offering expenses payable by us.

*At-the-Market Offering Programs*

In April 2022, we entered into an Open Market Sale Agreement℠ with Jefferies LLC (Jefferies) (the Jefferies ATM Offering Program), pursuant to which we may offer and sell, from time to time and at our option, up to an aggregate of $65.0 million of shares of our common stock through Jefferies, acting as sales agent. Jefferies is entitled to a fixed commission rate of up to 3.0% of the gross sales proceeds of shares sold under the Jefferies ATM Offering Program. During the year ended December 31, 2023, we sold an aggregate of 10,530,795 shares of common stock at a weighted-average price of $1.82 per share for net proceeds of approximately $18.4 million under the Jefferies ATM Offering Program. Additionally, from January 1, 2024 through March 13, 2024, we sold an aggregate of 4,441,509 shares of common stock at a weighted-average price of $1.75 per share for net proceeds of approximately $7.6 million under the Jefferies ATM Offering Program.

In May 2019, we entered into a sales agreement with H.C. Wainwright & Co., LLC (Wainwright) for an ATM Offering Program (the Wainwright ATM Offering Program) under which we could offer and sell shares of our common stock having an aggregate offering price of up to $10.0 million. In November 2020, we amended our sales agreement with Wainwright to increase the amount of the ATM Offering Program to $20.0 million. Wainwright was entitled to a commission at a fixed commission rate equal to 3% of the gross proceeds. In March 2021, the ATM Offering Program with Wainwright automatically terminated upon the issuance and sale of all of the shares having an aggregate offering price of $20.0 million. Prior to the termination of the sales agreement with Wainwright, in 2021, we sold an aggregate of 1,988,254 shares of common stock at an average price of $4.99 per share for net proceeds of $9.6 million.

*Purchase Agreement*

In September 2020, we entered into a common stock purchase agreement (the Purchase Agreement) with Aspire Capital Fund, LLC (Aspire Capital), which provided that, upon the terms and subject to the conditions and limitations set forth therein, Aspire Capital was committed to purchase up to an aggregate of $20.0 million of shares of our common stock at our request from time to time during the 30 month term of the Purchase Agreement. In 2021, we sold an aggregate of 3,000,000 shares of common stock at a weighted-average price of $5.09 per share for net proceeds of $15.2 million under the Purchase Agreement. There were no issuances or sales under the Purchase Agreement during the years ended December 31, 2023 and December 31, 2022, respectively, and this agreement was terminated on March 11, 2023.

*Kyorin Agreement Milestone Payments*

On February 6, 2023, we announced that our partner Kyorin dosed the first patient in Japan in the EFZO-FIT study, which triggered a $10.0 million milestone payment by Kyorin to us pursuant to the Kyorin Agreement. We recorded this $10.0 million milestone as revenue in December 2022 and received the cash in February 2023. Kyorin is our partner for the development and commercialization of efzofitimod for ILD in Japan. Under the Kyorin Agreement, we have generated $20.0 million in upfront and milestone payments to date and are eligible to receive up to an additional $155.0 million in the aggregate upon the achievement of certain development, regulatory and sales milestones, as well as tiered royalties on any net sales in Japan. Kyorin has the exclusive rights to develop and commercialize efzofitimod in Japan for all forms of ILD.

***Cash Flows***

The following table sets forth a summary of the net cash flow activity for each of the periods indicated (in thousands):

| | Years Ended December 31, | | |
|---|---|---|---|
| | **2023** | **2022** | **2021** |
| Net cash provided by (used in): | | | |
| Operating activities | $ (33,221) | $ (41,886) | $ (33,075) |
| Investing activities | (20,127) | 47,245 | (91,566) |
| Financing activities | 66,230 | 5,451 | 110,025 |
| Net change in cash, cash equivalents and restricted cash | $ 12,882 | $ 10,810 | $ (14,616) |

*Operating activities.* Net cash used in operating activities was $33.2 million, $41.9 million and $33.1 million for the years ended December 31, 2023, 2022 and 2021, respectively. The net cash used in each period is primarily due to the advancement of efzofitimod into later stage clinical trials and additional manufacturing campaigns to support those trials and potential future clinical trials. Net cash used in operating activities decreased during the year ended December 31, 2023 as we received a $10.0 million milestone payment from the Kyorin Agreement. We expect cash used in operating activities to increase as we advance our clinical and manufacturing efforts toward possible commercialization of efzofitimod.

*Investing activities.* Net cash (used in) provided by investing activities for the years ended December 31, 2023, 2022 and 2021 was $(20.1) million, $47.2 million and $(91.6) million, respectively. The fluctuation in net cash provided by or used in investing activities resulted primarily from the timing differences in investment purchases, sales and maturities, and the fluctuation of our portfolio mix between cash equivalents and investment holdings. The average term to maturity in our investment portfolio as of December 31, 2023 was less than two years. Net cash used for December 31, 2023 included $4.2 million purchases of property and equipment primarily for tenant improvements associated with our corporate headquarters facility lease.

*Financing activities.* Net cash provided by financing activities for the year ended December 31, 2023 was $66.2 million and consisted primarily of $48.1 million in proceeds from an underwritten follow-on public offering, net of offering costs, and $18.4 million proceeds from our Jefferies ATM Offering Program, net of issuance costs. Net cash provided by financing activities for the year ended December 31, 2022 was primarily due to cash proceeds from our ATM offering programs, net of issuance costs. Net cash provided by financing activities for the year ended December 31, 2021 was $110.0 million and consisted primarily of $80.6 million in proceeds from an underwritten follow-on public offering, net of offering costs, $15.2 million in proceeds from the issuance of common stock through a common stock purchase agreement, net of offering costs, and $14.1 million proceeds from our ATM offering programs, net of issuance costs.

***Material Cash Requirements***

To date, we have not generated any revenues from product sales. We expect our expenses to increase in connection with our ongoing activities, particularly as we continue to advance efzofitimod in clinical development, manufacturing and technology transfer activities, continue our research and development activities with respect to other potential therapies based on tRNA synthetase biology and seek marketing approval for product candidates that we may develop. In addition, if we obtain marketing approval for any of our product candidates, we expect to incur significant commercialization expenses related to product sales, marketing, manufacturing and distribution. We currently have no sales or marketing capabilities and would need to expand our organization to support these activities. Accordingly, we will need to obtain substantial additional funding in connection with our continuing operations. Our forecast of the period of time through which our financial resources will be adequate to support our operations is a forward-looking statement that involves risks and uncertainties, and actual results could vary materially.

Our future capital requirements are difficult to forecast and will depend on many factors. Refer to Part I, Item 1A, "Risk Factors - Risks related to our financial condition and need for additional capital—We will need to raise additional capital or enter into strategic partnering relationships to fund our operations." for a discussion of these factors.

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, grant funding, collaborations, strategic partnerships and/or licensing arrangements, and when we are closer to commercialization of our product candidates potentially through debt financings. To the extent we raise additional capital through the sale of equity, the ownership interest of our stockholders will be diluted, and the terms of these securities may include liquidation or other preferences that adversely affect the rights of our common stockholders. If we raise additional funds through collaborations, strategic partnerships or licensing arrangements with third parties, we may have to relinquish valuable rights to our product candidates, our other technologies, future revenue streams or research programs or grant licenses on terms that may not be favorable to us. The incurrence of additional indebtedness would increase our fixed payment obligations and may require us to agree to certain restrictive covenants, such as limitations on our ability to incur additional debt, limitations on our ability to acquire, sell or license intellectual property rights and other operating restrictions that could adversely impact our ability to conduct our business. We may be unable to raise additional funds on acceptable terms or at all. If the equity and credit markets deteriorate, it may make any necessary debt or equity financing more difficult, more costly and more dilutive. If we are unable to raise additional funds, we may be required to delay, limit, reduce or terminate our product development or future commercialization efforts or grant rights to develop and market our product candidates even if we would otherwise prefer to develop and market such product candidates ourselves.

As of December 31, 2023, our material cash requirements from known contractual and other obligations consisted primarily of (i) operating leases for our corporate headquarters and laboratory space, and (ii) our master financing lease agreement for various research and development and informational technology equipment.

*Corporate Headquarters Facility Lease*

In May 2022, we entered into a lease (Lease) with San Diego Creekside, LLC (Landlord), as lessor, pursuant to which we agreed to lease from Landlord approximately 23,696 rentable square feet (subject to increase pursuant to the terms of the Lease) of office and laboratory space. The term of the lease (the Lease Term) commenced on March 20, 2023 (the Lease Commencement Date) and will continue for 124 months from the Lease Commencement Date. We also have one option to extend the Lease Term for five years. Base rent during such extension period would be at the fair market rent for the Premises (as that term is defined in the Lease). Under the terms of the Lease, the base rent during the first 12 months of the Lease Term will be $5.75 per square foot of rentable area per month, subject to certain upward adjustments of approximately 3.0% annually. We are entitled to an allowance of up to $5.3 million for tenant improvements of which as of December 31, 2023, we received $5.0 million from the Landlord, and we received the remaining $0.3 million in February 2024. We provided a $0.7 million security deposit in the form of a letter of credit which is included in restricted cash as of December 31, 2023. During the second quarter of 2023, additional common area amenities were completed by the Landlord which provided us with access to approximately 1,500 additional rentable square feet. As a result, our base rent increased for this additional rentable square feet at the same monthly base rent per rentable square foot as contemplated in the Lease.

*Financing Lease*

In April 2022, we entered into a financing lease to lease various research and development and information technology equipment over a 48-month term. Financing lease liabilities total $1.9 million as of December 31, 2023. Additionally, we provided $2.7 million in cash collateral for the financing lease, and this amount is included in restricted cash as of December 31, 2023.

We did not have any off-balance sheet arrangements as of December 31, 2023.

**Financial Operations Overview**

***Organization and Business; Principles of Consolidation***

We conduct substantially all of our activities through aTyr Pharma, Inc., a Delaware corporation, at our facility in San Diego, California. aTyr Pharma, Inc. was incorporated in the State of Delaware in September 2005. The consolidated financial statements include our accounts and our 98% majority-owned subsidiary in Hong Kong, Pangu BioPharma, as of December 31, 2023. All intercompany transactions and balances are eliminated in consolidation.

***Revenue Recognition***

In January 2020, we entered into the Kyorin Agreement with Kyorin for the development and commercialization of efzofitimod for the treatment of ILD in Japan. Under the Kyorin Agreement, Kyorin received an exclusive right to develop and commercialize efzofitimod in Japan for all forms of ILD, and Kyorin is obligated to fund all research, development, regulatory, marketing and commercialization activities in Japan. The Phase 1 clinical trial, which was conducted and funded by Kyorin, was a placebo-controlled clinical trial to evaluate the safety, PK and immunogenicity of efzofitimod in 32 healthy Japanese male volunteers. Efzofitimod was observed to be generally well-tolerated with no drug-related serious adverse events and PK findings were consistent with previous studies of efzofitimod. Kyorin is also participating in the EFZO-FIT study as the local sponsor in Japan. In February 2023, Kyorin dosed the first patient in Japan in the EFZO-FIT study. This achievement triggered a $10.0 million milestone payment by Kyorin to us pursuant to the Kyorin Agreement. This milestone was recorded as revenue during the year ended December 31, 2022, and the payment was received during the year ended December 31, 2023. Under the Kyorin Agreement, we have generated $20.0 million in upfront and milestone payments to date and are eligible to receive up to an additional $155.0 million in the aggregate upon the achievement of certain development, regulatory and sales milestones, as well as tiered royalties on any net sales in Japan. During the year ended December 31, 2023, we recognized $0.4 million in collaboration revenue from Kyorin for drug product material sold to Kyorin for the Japan portion of the EFZO-FIT study.

***Research and Development Expenses***

To date, our research and development expenses have been related primarily to the development of, and clinical trials for, our product candidates, and to research efforts targeting the potential therapeutic application of other tRNA synthetase-based immunomodulators. These expenses consist primarily of:

- salaries and employee-related expenses, including stock-based compensation and benefits for personnel in research and product development functions;
- costs associated with conducting our preclinical, development and regulatory activities, including fees paid to third-party professional consultants, service providers and our scientific, therapeutic and clinical advisory board;
- costs to acquire, develop and manufacture preclinical study and clinical trial materials;
- costs incurred under clinical trial agreements with CROs and investigative sites;
- costs for laboratory supplies; and
- allocated facilities, depreciation and other allocable expenses.

Product candidates in later stages of clinical development generally have higher development costs than those in earlier stages of clinical development, primarily due to the increased size and duration of later-stage clinical trials. We expect that the levels of our research and development expenses will continue to increase in future years and will consist primarily of costs related to our clinical development and manufacturing of efzofitimod for patients with pulmonary sarcoidosis and SSc-ILD, and other potential therapeutics based on tRNA synthetase biology.

At this time, due to the inherently unpredictable nature of preclinical and clinical development and given the early stage of our programs, we are unable to estimate with any certainty the costs we will incur or the timelines we will require in the continued development of our product candidates. Clinical and preclinical development timelines, the probability of success and development

costs can differ materially from expectations. We anticipate that we will make determinations as to which product candidates to pursue and how much funding to direct to each product candidate on an ongoing basis in response to the results of ongoing and future preclinical studies and clinical trials, regulatory developments and our ongoing assessments as to each product candidate's commercial potential. In addition, we cannot forecast which programs or product candidates may be subject to future collaborations, when such arrangements will be secured, if at all, and to what degree such arrangements would affect our development plans and capital requirements.

***General and Administrative Expenses***

General and administrative expenses consist primarily of salaries and related costs for employees in executive, finance and administration, corporate development and administrative support functions, including stock-based compensation expenses and benefits. Other significant general and administrative expenses include accounting, legal services, expenses associated with applying for and maintaining patents, cost of insurance, cost of various consultants, occupancy costs, information systems costs and depreciation.

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

Our management's discussion and analysis of financial condition and results of operations is based on our consolidated financial statements, which have been prepared in accordance with accounting principles generally accepted in the United States. The preparation of these consolidated 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 as of the date of the consolidated financial statements, as well as the reported expenses during the reporting periods. We monitor and analyze these items for changes in facts and circumstances, and material changes in these estimates could occur in the future. We base our estimates on our historical experience and on various other factors we believe to be 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. Changes in estimates are reflected in reported results for the period in which they become known. Actual results may differ materially from these estimates under different assumptions or conditions.

We discuss our accounting policies and assumptions that involve a higher degree of judgment and complexity within Note 2 to our audited consolidated financial statements appearing elsewhere in this Annual Report. We believe that our accounting policies related to research and development expense accruals involve the most significant estimation and judgment in accounting for our reported consolidated financial results.

***Research and Development Expense Accruals***

As part of the process of preparing our consolidated financial statements, we are required to estimate our accrued expenses. This process involves reviewing open contracts and purchase orders, communicating with our personnel to identify services that have been performed on our behalf and estimating the level of service performed and the associated cost incurred for the service when we have not yet been invoiced or otherwise notified of the actual cost. The majority of our service providers invoice us monthly in arrears for services performed or when contractual milestones are met. We make estimates of our accrued expenses as of each balance sheet date in our consolidated financial statements based on facts and circumstances known to us at that time. We periodically confirm the accuracy of our estimates with the service providers and make adjustments if necessary. Examples of estimated accrued research and development expenses include fees paid to investigative sites and CROs in connection with clinical trials; service providers in connection with preclinical development activities; and service providers related to product manufacturing, development and distribution of clinical supplies.

We currently rely on third parties for the clinical development of our product candidates and the manufacture of our product candidates to support our ongoing and future clinical trials. We pay these third parties, including consultants, CROs, CDMOs and other service providers, pursuant to contractual arrangements, which may include provisions for time and materials-based payments, project-based fees and milestone payments. We base our accrual for these expenses on our estimates of the services received and efforts expended pursuant to our contractual arrangements. The financial terms of these agreements are subject to negotiation, vary from contract to contract and may result in uneven payment flows. There may be instances in which payments made to our service providers will exceed the level of services provided and result in a prepayment of the clinical expense. Payments under some of these contracts depend on factors such as the successful enrollment of patients and the completion of clinical milestones. In accruing service fees, we estimate the time period over which services will be performed and the level of effort to be expended in each period. If the actual timing of the performance of services or the level of effort varies from our estimate, we adjust our accrual or prepaid expenses accordingly.

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 differs from the actual status and timing of services performed, we may report amounts that are too high or too low in any particular period. To date, there have been no material differences between our estimates and the amounts actually incurred.

***Results of Operations***

**Comparison of the Years Ended December 31, 2023 and 2022**

In this section, we discuss the results of our operations for the year ended December 31, 2023, compared to the year ended December 31, 2022. For a discussion of the year ended December 31, 2022 compared to the year ended December 31, 2021, please refer to our Annual Report on Form 10-K filed with the Securities and Exchange Commission on March 14, 2023.

The following table summarizes our results of operations for the years ended December 31, 2023 and 2022 (in thousands):

| | Years Ended December 31, 2023 | 2022 | Increase / (Decrease) |
|---|---|---|---|
| License and collaboration agreement revenues | $ 353 | $ 10,386 | $ (10,033) |
| Research and development expenses | 42,293 | 42,808 | (515) |
| General and administrative expenses | 12,979 | 13,982 | (1,003) |
| Other income (expense), net | 4,522 | 1,061 | 3,461 |

*License and collaboration agreement revenues.* Revenues of $0.4 million for the year ended December 31, 2023 consisted of drug product material sold to Kyorin for the Japan portion of the EFZO-FIT study while revenues of $10.4 million for the year ended December 31, 2022 consisted primarily of the $10.0 million development milestone earned under the Kyorin Agreement as Kyorin dosed the first patient in the Japan portion of the EFZO-FIT study.

*Research and development expenses.* Research and development expenses were $42.3 million and $42.8 million for the years ended December 31, 2023 and 2022, respectively. The decrease of $0.5 million was due primarily to a decrease of $3.8 million in manufacturing costs due to the timing of the associated manufacturing activities conducted, a reduction of $1.9 million in earlier stage discovery research and development costs as well a reduction of $0.7 million in personnel costs. The reduction in personnel related expenses was primarily due to the recognition of the ERC benefit made available under the CARES Act as discussed under Note 2 - “Summary of Significant Accounting Policies” of our consolidated financial statements included in this Annual Report. These decreases were partially offset by an increase of $5.9 million in clinical trial costs for the EFZO-FIT and EFZO-CONNECT studies as those studies progressed during the year ended December 31, 2023. We expect research and development expenses to increase as we advance our clinical and manufacturing efforts toward possible commercialization of efzofitimod.

*General and administrative expenses.* General and administrative expenses were $13.0 million and $14.0 million for the years ended December 31, 2023 and 2022, respectively. The decrease of $1.0 million was due primarily to a decrease of $0.8 million in personnel related expense. The reduction in personnel related expenses was primarily due to the recognition of the ERC benefit made available under the CARES Act as discussed under Note 2 - “Summary of Significant Accounting Policies” of our consolidated financial statements included in this Annual Report.

*Other income (expense), net.* Other income (expense), net was $4.5 million and $1.1 million for years ended December 31, 2023 and 2022, respectively. The increase was primarily a result of interest earned on higher cash, cash equivalents, restricted cash and available-for-sale investments balances during the year ended December 31, 2023 as compared to the prior year, and increased interest rates.

**Recent Accounting Pronouncements**

For discussion of recently issued accounting pronouncements, refer to the Section titled “Recent Accounting Pronouncements” within Note 2 of our consolidated financial statements included in this Annual Report.

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

Not Applicable.

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

## Report of Independent Registered Public Accounting Firm

To the Stockholders and Board of Directors of aTyr Pharma, Inc.

**Opinion on the Financial Statements**

We have audited the accompanying consolidated balance sheets of aTyr Pharma, Inc. (the Company) as of December 31, 2023 and 2022, the related consolidated statements of operations, comprehensive loss, stockholders' equity and cash flows for each of the three years in the period ended December 31, 2023, and the related notes (collectively referred to as the "consolidated financial statements"). In our opinion, the consolidated financial statements present fairly, in all material respects, the financial position of the Company at December 31, 2023 and 2022, and the results of its operations and its cash flows for each of the three years in the period ended December 31, 2023, in conformity with U.S. generally accepted accounting principles.

**Basis for Opinion**

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

We conducted our audits in accordance with the standards of the PCAOB. Those standards require that we plan and perform the audit to obtain reasonable assurance about whether the financial statements are free of material misstatement, whether due to error or fraud. The Company is not required to have, nor were we engaged to perform, an audit of its internal control over financial reporting. As part of our audits we are required to obtain an understanding of internal control over financial reporting but not for the purpose of expressing an opinion on the effectiveness of the Company's internal control over financial reporting. Accordingly, we express no such opinion.

Our audits included performing procedures to assess the risks of material misstatement of the financial statements, whether due to error or fraud, and performing procedures that respond to those risks. Such procedures included examining, on a test basis, evidence regarding the amounts and disclosures in the financial statements. Our audits also included evaluating the accounting principles used and significant estimates made by management, as well as evaluating the overall presentation of the financial statements. We believe that our audits provide a reasonable basis for our opinion.

**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 consolidated 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 clinical and manufacturing costs***

| | |
|---|---|
| Description of the Matter | As of December 31, 2023, the Company had $7.8 million of clinical and manufacturing costs recorded as an accrual. A substantial portion of the Company's ongoing research and development activities are conducted by third-party service providers, including clinical research organizations and contracted development and manufacturing organizations. As described in Note 2 to the consolidated financial statements, external costs for clinical and manufacturing to be paid are accrued and expensed based upon work completed in accordance with contractual arrangements.<br><br>Auditing management's accounting for accrued clinical and manufacturing costs is especially challenging because it is dependent on data from third parties and involves judgments applied by management to determine the commencement and completion date of vendor tasks as well as the extent of work performed during the reporting period, which may not match the pattern of bills received or payments made to third-party service providers. The testing of accrued clinical and manufacturing costs is dependent upon a high-volume of data and input exchanged between clinical personnel and third-party service providers, which includes the total clinical trial management costs, number of sites activated, number of patients enrolled, and number of patient visits, which is tracked in spreadsheets and other end user computing programs. |
| How We Addressed the Matter in Our Audit | Our substantive testing procedures over the completeness of the Company's accrued clinical and manufacturing costs include obtaining from third-parties confirmation of total costs billed and work completed as of December 31, 2023, for significant clinical trial and manufacturing activities. We obtained an understanding of the status of significant clinical trial and manufacturing activities from accounting personnel and the clinical project managers to understand the status of significant clinical trial and manufacturing activities. To assess the appropriate measurement of accrued clinical and manufacturing costs, we inspected key terms, timelines of completion, activities and costs for a sample of vendor contracts, including amendments, and compared these to management's analyses used in tracking the progress of service agreements. We also inspected a sample of subsequent payments, obtained invoice support and tested the expense was recorded to the appropriate period. |

/s/ Ernst & Young LLP

We have served as the Company's auditor since 2008.

San Diego, California

March 14, 2024

**aTyr Pharma, Inc.**
**Consolidated Balance Sheets**
**(in thousands, except share and per share data)**

| | December 31, 2023 | December 31, 2022 |
|---|---|---|
| **Assets** | | |
| Current assets: | | |
| Cash and cash equivalents | $ 22,544 | $ 9,981 |
| Available-for-sale investments | 75,622 | 56,165 |
| Other receivables | 2,436 | 11,775 |
| Prepaid expenses | 2,390 | 2,950 |
| Total current assets | 102,992 | 80,871 |
| Restricted cash | 3,484 | 3,165 |
| Property and equipment, net | 5,531 | 3,059 |
| Operating lease, right-of-use assets | 6,727 | 7,250 |
| Financing lease, right-of-use assets | 1,788 | 1,248 |
| Other assets | 131 | 193 |
| Total assets | $ 120,653 | $ 95,786 |
| **Liabilities and Stockholders' Equity** | | |
| Current liabilities: | | |
| Accounts payable | $ 3,529 | $ 3,106 |
| Accrued expenses | 11,559 | 9,862 |
| Current portion of operating lease liability | 831 | 630 |
| Current portion of financing lease liability | 497 | 264 |
| Total current liabilities | 16,416 | 13,862 |

| | | |
|---|---|---|
| Long-term operating lease liability, net of current portion | 12,339 | 9,633 |
| Long-term financing lease liability, net of current portion | 1,428 | 1,007 |
| Commitments and contingencies (Note 6) | | |
| Stockholders' equity: | | |
| Preferred stock, $ 0.001 par value per share; 5,000,000 undesignated authorized shares as of December 31, 2023 and 2022, respectively; no shares issued or outstanding as of December 31, 2023 and 2022, respectively | — | — |
| Common stock, $ 0.001 par value per share; 170,000,000 and 85,000,000 authorized shares as of December 31, 2023 and 2022, respectively; issued and outstanding shares – 63,286,404 and 29,498,488 as of December 31, 2023 and 2022, respectively | 63 | 29 |
| Additional paid-in capital | 558,692 | 489,502 |
| Accumulated other comprehensive loss | (74) | (433) |
| Accumulated deficit | (468,023) | (417,634) |
| Total aTyr Pharma, Inc. stockholders' equity | 90,658 | 71,464 |
| Noncontrolling interest in Pangu BioPharma Limited | (188) | (180) |
| Total stockholders' equity | 90,470 | 71,284 |
| Total liabilities and stockholders' equity | $ 120,653 | $ 95,786 |

*See accompanying notes.*

**aTyr Pharma, Inc.**
**Consolidated Statements of Operations**
**(in thousands, except share and per share data)**

| | Years Ended December 31, | | |
|---|---|---|---|
| | 2023 | 2022 | 2021 |
| Revenues: | | | |
| License and collaboration agreement revenues | $ 353 | $ 10,386 | $ — |
| Total revenues | 353 | 10,386 | — |
| Operating expenses: | | | |
| Research and development | 42,293 | 42,808 | 23,264 |
| General and administrative | 12,979 | 13,982 | 10,751 |
| Total operating expenses | 55,272 | 56,790 | 34,015 |
| Loss from operations | ( 54,919 ) | ( 46,404 ) | ( 34,015 ) |
| Total other income (expense), net | 4,522 | 1,061 | 238 |
| Consolidated net loss | ( 50,397 ) | ( 45,343 ) | ( 33,777 ) |
| Net loss attributable to noncontrolling interest in Pangu BioPharma Limited | 8 | 5 | 9 |
| Net loss attributable to aTyr Pharma, Inc. | $ ( 50,389 ) | $ ( 45,338 ) | $ ( 33,768 ) |
| Net loss per share, basic and diluted | $ ( 0.94 ) | $ ( 1.60 ) | $ ( 1.77 ) |
| Shares used in computing net loss per share, basic and diluted | 53,606,488 | 28,419,569 | 19,080,878 |

*See accompanying notes.*

**aTyr Pharma, Inc.**
**Consolidated Statements of Comprehensive Loss**
**(in thousands)**

| | Years Ended December 31, | | |
|---|---|---|---|
| | **2023** | **2022** | **2021** |
| Consolidated net loss | $ (50,397) | $ (45,343) | $ (33,777) |
| Other comprehensive loss: | | | |
| Change in unrealized gain (loss) on available-for-sale investments, net of tax | 359 | (170) | (220) |
| Comprehensive loss | (50,038) | (45,513) | (33,997) |
| Comprehensive loss attributable to noncontrolling interest in Pangu BioPharma Limited | 8 | 5 | 9 |
| Comprehensive loss attributable to aTyr Pharma, Inc. common stockholders | $ (50,030) | $ (45,508) | $ (33,988) |

*See accompanying notes.*

**aTyr Pharma, Inc.**
**Consolidated Statements of Stockholders' Equity**
**(in thousands, except share data)**

| | Common Stock Shares | Common Stock Amount | Additional Paid-In Capital | Other Comprehensive Gain/(Loss) | Accumulated Deficit | Noncontrolling Interest | Total Stockholders' Equity |
|---|---|---|---|---|---|---|---|
| Balance as of December 31, 2020 | 11,018,954 | $ 11 | $ 370,210 | $ (43) | $ (338,528) | $ (166) | $ 31,484 |
| Issuance of common stock upon release of restricted stock units | 4,177 | — | — | — | — | — | — |
| Issuance of common stock upon exercise of stock options | 10,751 | — | 62 | — | — | — | 62 |
| Issuance of common stock pursuant to employee stock purchase plan | 3,382 | — | 11 | — | — | — | 11 |
| Issuance of common stock from at-the-market offerings, net of offering costs | 2,974,521 | 3 | 14,067 | — | — | — | 14,070 |
| Issuance of common stock from committed purchase agreement, net of offering costs | 3,000,000 | 3 | 15,233 | — | — | — | 15,236 |
| Issuance of common stock from underwritten follow-on offering, net of offering costs | 10,781,250 | 11 | 80,635 | — | — | — | 80,646 |
| Stock-based compensation | — | — | 1,614 | — | — | — | 1,614 |
| Net unrealized loss on investments, net of tax | — | — | — | (220) | — | — | (220) |
| Net loss | — | — | — | — | (33,768) | (9) | (33,777) |
| Balance as of December 31, 2021 | 27,793,035 | 28 | 481,832 | (263) | (372,296) | (175) | 109,126 |
| Issuance of common stock upon release of restricted stock units | 2,500 | — | — | — | — | — | — |
| Issuance of common stock upon exercise of stock options | 259 | — | 1 | — | — | — | 1 |
| Issuance of common stock pursuant to employee stock purchase plan | 20,612 | — | 44 | — | — | — | 44 |

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| Issuance of common stock from at-the-market offerings, net of offering costs | 1,682,082 | 1 | 5,471 | — | — | — | 5,472 |
| Stock-based compensation | — | — | 2,154 | — | — | — | 2,154 |
| Net unrealized loss on investments, net of tax | — | — | — | (170) | — | — | (170) |
| Net loss | — | — | — | — | (45,338) | (5) | (45,343) |
| Balance as of December 31, 2022 | 29,498,488 | 29 | 489,502 | (433) | (417,634) | (180) | 71,284 |
| Issuance of common stock upon release of restricted stock units | 58,111 | — | — | — | — | — | — |
| Issuance of common stock pursuant to employee stock purchase plan | 74,010 | — | 105 | — | — | — | 105 |
| Issuance of common stock from at-the-market offerings, net of offering costs | 10,530,795 | 11 | 18,435 | — | — | — | 18,446 |
| Issuance of common stock from underwritten follow-on offering, net of offering costs | 23,125,000 | 23 | 48,050 | — | — | — | 48,073 |
| Stock-based compensation | — | — | 2,600 | — | — | — | 2,600 |
| Net unrealized gain on investments, net of tax | — | — | — | 359 | — | — | 359 |
| Net loss | — | — | — | — | (50,389) | (8) | (50,397) |
| Balance as of December 31, 2023 | 63,286,404 | $ 63 | $ 558,692 | $ (74) | $ (468,023) | $ (188) | $ 90,470 |

*See accompanying notes.*

**aTyr Pharma, Inc.**
**Consolidated Statements of Cash Flows**
**(in thousands)**

| | Years Ended December 31, | | |
|---|---|---|---|
| | 2023 | 2022 | 2021 |
| **Cash flows from operating activities:** | | | |
| Consolidated net loss | $ (50,397) | $ (45,343) | $ (33,777) |
| Adjustments to reconcile net loss to net cash used in operating activities: | | | |
| Depreciation and amortization | 592 | 232 | 475 |
| Stock-based compensation | 2,600 | 2,154 | 1,614 |
| (Accretion) amortization of (discount) premium of available-for-sale investment securities | (3,171) | 533 | 366 |
| Amortization of right-of-use assets | 2,149 | 1,463 | 829 |
| (Gain) loss on disposal of property and equipment | (6) | (92) | 6 |
| Changes in operating assets and liabilities: | | | |
| Other receivables | 9,054 | (11,923) | 1,604 |
| Prepaid expenses and other assets | 622 | 2,238 | (3,378) |
| Accounts payable and accrued expenses | 3,262 | 6,741 | 47 |
| Operating lease liability | 2,074 | 2,111 | (861) |
| Net cash used in operating activities | (33,221) | (41,886) | (33,075) |
| **Cash flows from investing activities:** | | | |
| Purchases of property and equipment | (4,215) | (1,641) | (192) |
| Purchases of available-for-sale investment securities | (106,977) | (42,118) | (126,506) |
| Maturities of available-for-sale investment securities | 91,050 | 90,825 | 35,082 |
| Proceeds from sale of property and equipment | 15 | 179 | 50 |
| Net cash (used in) provided by investing activities | (20,127) | 47,245 | (91,566) |
| **Cash flows from financing activities:** | | | |
| Proceeds from issuance of common stock through option exercises | — | 1 | 62 |

| | | | |
|---|---|---|---|
| Proceeds from issuance of common stock through employee stock purchase plan | 105 | 44 | 11 |
| Proceeds from issuance of common stock from at-the-market offerings, net of offering costs | 18,446 | 5,472 | 14,070 |
| Proceeds from issuance of common stock from committed purchase agreement, net of offering costs | — | — | 15,236 |
| Proceeds from issuance of common stock from underwritten follow-on public offering, net of offering costs | 48,073 | — | 80,646 |
| Principal paid on finance lease liabilities | (394) | (66) | — |
| Net cash provided by financing activities | 66,230 | 5,451 | 110,025 |
| Net change in cash, cash equivalents and restricted cash | 12,882 | 10,810 | (14,616) |
| Cash, cash equivalents and restricted cash at beginning of period | 13,146 | 2,336 | 16,952 |
| Cash, cash equivalents and restricted cash at the end of period | $ 26,028 | $ 13,146 | $ 2,336 |
| Cash and cash equivalents at the end of period | $ 22,544 | $ 9,981 | $ 2,336 |
| Restricted cash at the end of period | 3,484 | 3,165 | — |
| Cash, cash equivalents and restricted cash at the end of period | $ 26,028 | $ 13,146 | $ 2,336 |
| **Supplemental disclosure of cash flow information:** | | | |
| Interest paid | $ 172 | $ 54 | $ — |
| Purchases of property and equipment in accounts payable | $ 51 | $ 1,194 | $ — |
| Right-of-use assets obtained in exchange for lease obligation | $ 1,854 | $ 8,695 | $ — |

*See accompanying notes.*

**aTyr Pharma, Inc.**

**Notes to Consolidated Financial Statements**

## 1. Organization, Business and Basis of Presentation

### Organization and Business

We were incorporated in the state of Delaware on September 8, 2005. We are a clinical stage biotechnology company leveraging evolutionary intelligence to translate tRNA synthetase biology into new therapies for fibrosis and inflammation. tRNA synthetases are ancient, essential proteins that have evolved novel domains that regulate diverse pathways extracellularly in humans. Our discovery platform is focused on unlocking hidden therapeutic intervention points by uncovering signaling pathways driven by our proprietary library of domains derived from all 20 tRNA synthetases.

### Principles of Consolidation

Our consolidated financial statements include our accounts and our

98

% majority-owned subsidiary in Hong Kong, Pangu BioPharma Limited (Pangu BioPharma). All intercompany transactions and balances are eliminated in consolidation.

### Liquidity and Financial Condition

We have incurred losses and negative cash flows from operations since our inception. As of December 31, 2023, we had an accumulated deficit of $

468.0

million and we expect to continue to incur net losses for the foreseeable future. As of December 31, 2023, our cash, cash equivalents, available-for-sale investments and restricted cash were $

101.7

million. We currently have an “at-the-market” offering program (the Jefferies ATM Offering Program) through an Open Market Sale Agreement℠ with Jefferies LLC (Jefferies). During the year ended December 31, 2023, we sold an aggregate of

10,530,795

shares of common stock at a weighted-average price of $

1.82

per share for net proceeds of approximately $

18.4

million under the Jefferies ATM Offering Program. Additionally, from January 1, 2024 through March 13, 2024, we sold an aggregate of 4,441,509 shares of common stock at a weighted-average price of $1.75 per share for net proceeds of approximately $7.6 million under the Jefferies ATM Offering Program. We believe that our current cash, cash equivalents, available-for-sale investments and restricted cash, will be sufficient to meet our anticipated cash requirements for a period of at least one year from the date of this Annual Report.

We do not expect to generate any revenues from product sales unless and until we successfully complete development and obtain regulatory approval for one or more of our product candidates, which we expect will take a number of years at a minimum. If we obtain regulatory approval for any of our product candidates, we expect to incur significant commercialization expenses related to product sales, marketing, manufacturing and distribution. Accordingly, we will need to raise substantial additional capital to fund our operations. The amount and timing of our future funding requirements will depend on many factors, including the pace and results of our preclinical and clinical development efforts and the timing and nature of the regulatory approval process for our product candidates. We anticipate that we will seek to fund our operations through equity offerings, grant funding, collaborations, strategic partnerships and/or licensing arrangements, and when we are closer to commercialization of our product candidates potentially through debt financings. However, we may be unable to raise additional capital or enter into such arrangements when needed on favorable terms or at all. Our failure to raise capital or enter into such arrangements when needed would have a negative impact on our financial condition and ability to develop our product candidates.

### Restricted Cash

As of December 31, 2023, restricted cash was approximately $

3.5

million, which was held as a security deposit in conjunction with our corporate headquarter facility lease and financing leases as discussed further in Note 6 - Commitments and Contingencies.

### Use of Estimates

Our consolidated financial statements are prepared in accordance with generally accepted accounting principles (GAAP). The preparation of our consolidated financial statements requires us to make estimates and assumptions that impact the reported amounts of assets, liabilities and expenses and the disclosure for these items in our consolidated financial statements and accompanying notes. The most significant estimates in our consolidated financial statements relate to the fair value of equity issuances and awards, and clinical trial and research and development expenses. Although these estimates are based on our knowledge of current events and actions we may undertake in the future, actual results may ultimately differ materially from these estimates and assumptions.

**Segment Reporting**

Operating segments are identified as components of an enterprise about which separate discrete financial information is available for evaluation by the chief operating decision-maker in making decisions regarding resource allocation and assessing performance. We view our operations and manage our business in

one
operating segment

**2. Summary of Significant Accounting Policies**

**Cash and Cash Equivalents and Restricted Cash**

Cash, cash equivalents and restricted cash consist of checking, money market and highly liquid investments that are readily convertible to cash and that have an original maturity of three months or less from date of purchase. The carrying amounts approximate fair value due to the short maturities of these instruments.

**Employee Retention Credit**

On March 27, 2020, the Coronavirus Aid, Relief, and Economic Security Act (CARES Act) was signed into law providing numerous tax incentives and other stimulus measures, including an employee retention credit (ERC), which is a refundable tax credit against certain employment taxes. The Taxpayer Certainty and Disaster Tax Relief Act of 2020 and the American Rescue Plan Act of 2021 extended and expanded the availability of the ERC.

As a result of the foregoing legislation, we determined that we are eligible to claim an ERC benefit equal to

50
% of qualified wages that we paid to our employees between March 17, 2020 and December 31, 2020, and

70
% of the qualified wages that we paid to our employees between January 1, 2021 and September 30, 2021. Qualified wages are limited to $

10,000
per employee for March 17, 2020 through December 31, 2020, and $

10,000
per employee per calendar quarter from January 1, 2021 through September 30, 2021. Our credit was primarily derived from qualified wages during January 1, 2021 through September 30, 2021. To determine eligibility for January 1, 2021 through September 30, 2021, we compared gross receipts for each calendar quarter in 2021 to the corresponding calendar quarter in 2019 and determined that we had met the requirement for a decline in gross receipts.

Accounting Standards Codification (ASC) Topic 105, *Generally Accepted Accounting Principles* describes the decision-making framework when no guidance exists in U.S. GAAP for a particular transaction. Specifically, ASC 105-10-05-2 instructs companies to look for guidance for a similar transaction within U.S. GAAP and apply that guidance by analogy. We accounted for the ERC by analogy to International Accounting Standards (IAS) 20, Accounting for Government Grants and Disclosure of Government Assistance, of International Financial Reporting Standards (IFRS). Under an IAS 20 analogy, a business entity would recognize the credit on a systematic basis over the periods in which the entity recognizes the payroll expenses for which the ERC is intended to compensate when there is reasonable assurance that the entity will comply with any conditions attached to the ERC and the ERC will be received.

During the year ended December 31, 2023, we amended certain payroll tax filings and applied for a refund of $

1.2
million of ERC benefits. The refund was recorded within the other receivables in our consolidated balance sheet, and as a $

0.8
million reduction of research and development expenses and a $

0.4
million reduction of general and administrative expenses in our consolidated statements of operations for the year ended December 31, 2023.

**Allowance of Credit Losses**

For available-for-sale securities in an unrealized loss position, we first assess whether we intend to sell, or if it is more likely than not that we will be required to sell, the security before recovery of its amortized cost basis. If either of the criteria regarding intent or requirement to sell is met, the security's amortized cost basis is written down to fair value through earnings. For available-for-sale securities that do not meet the aforementioned criteria, we evaluate whether the decline in fair value has resulted from credit losses or other factors. In making this assessment, we consider the severity of the impairment, any changes in interest rates, market conditions, changes to the underlying credit ratings and forecasted recovery, among other factors. The credit-related portion of unrealized losses, and any subsequent improvements, are recorded in interest income through an allowance account. Any impairment that has not been recorded through an allowance for credit losses is included in other comprehensive income (loss) on the consolidated statements of operations and comprehensive loss.

We elected the practical expedient to exclude the applicable accrued interest from both the fair value and amortized costs basis of our available-for-sale securities for purposes of identifying and measuring an impairment. Accrued interest receivable on available-for-sale securities is recorded within other receivables on our consolidated balance sheets. Our accounting policy is to not measure an allowance for credit loss for accrued interest receivable and to write-off any uncollectible accrued interest receivable as a reversal of interest income in a timely manner, which we consider to be in the period in which we determine the accrued interest will not be collected by us.

**Concentration of Credit Risk**

Financial instruments that potentially subject us to significant concentration of credit risk consist primarily of cash, cash equivalents, restricted cash and investment securities. We have established guidelines regarding diversification of investments and their maturities, which are designed to maintain principal and maximize liquidity. We maintain deposits in federally insured financial institutions in excess of federally insured limits. We have not experienced any losses in such accounts and we believe that we are not exposed to significant credit risk due to the financial position of the depository institutions in which those deposits are held.

**Property and Equipment**

Property and equipment are stated at cost and depreciated on a straight-line basis over the estimated useful life of the related assets (generally three to seven years ). Leasehold improvements are stated at cost and amortized on a straight-line basis over the lesser of the remaining term of the related lease or the estimated useful life of the leasehold improvements. Repairs and maintenance costs are charged to expense as incurred.

**Impairment of Long-Lived Assets**

Long-lived assets consist primarily of property and equipment and right-of-use assets (ROU) associated with our operating and financing leases. An impairment loss is recorded if and when events and circumstances indicate that assets might be impaired and the undiscounted cash flows estimated to be generated by those assets are less than the carrying amount of those assets. While our current and historical operating losses are indicators of impairment, we believe that future cash flows to be received support the carrying value of our long-lived assets and, accordingly, have

no
t recognized any impairment losses since inception.

**Accrued Expenses**

Accrued expenses include salaries, wages, benefits costs, consulting fees, legal and research and development costs. We have entered into contractual arrangements related to our clinical studies with clinical research organizations (CROs) and contracted development and manufacturing organizations (CDMOs) and recognize expense based on work completed and efforts expended pursuant to our contractual arrangements. We make estimates of our accrued CRO costs as of each balance sheet date based on facts and circumstances known at the time and include total trial management costs, sites activated, patients enrolled and number of patient visits. We estimate the time period over which services will be performed and the level of effort to be expended in each period. There may be instances in which payments made to our service providers including CROs and CDMOs, will temporarily exceed the level of services provided and result in a prepayment of the expense. If the actual timing of the performance of services or the level of effort varies from our estimate, we adjust the accrual or prepaid expense balance accordingly. Historically, our estimated accrued liabilities have materially approximated actual expenses incurred.

**Leases**

We determine if an arrangement is a lease at inception. Short-term leases with an initial term of 12 months or less are not recorded on our balance sheet. For long-term leases with an initial term of greater than 12 months, we recognize a right-of-use asset (ROU) and a lease liability based on the present value of future lease payments using an estimated rate of interest that we would pay to borrow equivalent funds on a collateralized basis at the lease commencement date. We determine the lease term at the commencement date by considering whether renewal options and termination options are reasonably assured of exercise. Rent expense for operating leases is recognized on a straight-line basis over the lease term and is included in operating expenses in our consolidated statements of operations. For financing leases, interest expense and amortization of the ROU is included in operating expenses in our consolidated statements of operations and variable lease payments are recorded as incurred.

If a lease is modified, the modified contract is evaluated to determine whether it is or contains a lease. If a lease continues to exist, the lease modification is determined to be a separate contract when the modification grants the lessee an additional ROU that is not included in the original lease and the lease payments increase commensurate with the standalone price for the additional ROU. A lease modification that results in a separate contract will be accounted for in the same manner as a new lease. For a modification that is not a separate contract, we reassess the lease classification using the modified terms and conditions and the facts and circumstances as of the effective date of the modification and recognize the amount of the remeasurement of the lease liability for the modified lease as an adjustment to the corresponding lease ROU asset.

Our ROU assets consist of non-cancelable operating leases and financing leases. Non-cancelable operating leases consist of leases for our corporate headquarters and additional laboratory space. Financing leases consist of leases for various research and development and information technology equipment.

We do not separate lease and non-lease components for our long-term leases.

**Revenue Recognition**

We evaluate our agreements under ASC Topic 606, *Revenue from Contracts with Customers* and ASC Topic 808, *Collaborative Arrangements*. We recognize revenue when we transfer promised goods or services to customers in an amount that reflects the consideration to which we expect to be entitled in exchange for those goods or services. In determining the appropriate amount of revenue to be recognized as we fulfill our obligations under our agreement, we perform the following steps: (i) identification of the promised goods or services in the contract; (ii) determination of whether the promised goods or services are performance obligations including whether they are distinct in the context of the contract; (iii) measurement of the transaction price, including the constraint on variable consideration; (iv) allocation of the transaction price to the performance obligations; and (v) recognition of revenue when (or as) we satisfy each performance obligation. As part of the accounting for these arrangements, we must develop assumptions that require judgment to determine the stand-alone selling price for each performance obligation identified in the contract. We use key assumptions to determine the stand-alone selling price, which may include forecasted revenues, development timelines, reimbursement rates for personnel costs, discount rates and probabilities of technical and regulatory success.

We recognize revenue in one of two ways, over time or at a point in time. We recognize revenue over time when we are executing on our performance obligation over time and our partner receives benefit over time. For example, we recognize revenue over time when we provide research and development services. We recognize revenue at a point in time when we transfer control of a distinct performance obligation to our partner. For example, if a license to our intellectual property is determined to be distinct from the other performance obligations identified in the arrangement, we recognize revenues from non-refundable, up-front fees allocated to the license when the license is transferred to the licensee and the licensee is able to use and benefit from the license.

**Research and Development Costs**

Research and development costs are expensed as incurred. Research and development costs include: salaries and employee-related expenses, including stock-based compensation and benefits for personnel in research and product development functions; costs associated with conducting our preclinical, development and regulatory activities, including fees paid to third-party professional consultants, service providers and our scientific, therapeutic and clinical advisors; costs to acquire, develop and manufacture preclinical study and clinical trial materials; costs incurred under clinical trial agreements with CROs and investigative sites; costs for laboratory supplies; payments related to licensed products and technologies; allocated facilities and information technology costs; and depreciation.

**Patent Costs**

Costs related to filing and pursuing patent applications are recorded as general and administrative expense and expensed as incurred since recoverability of such expenditures is uncertain.

**Stock-Based Compensation**

We evaluate our stock-based compensation arrangements under ASC Topic 718, *Compensation – Stock Compensation.* Stock-based compensation expense represents the grant date fair value of employee stock option and restricted stock unit grants recognized as expense over the requisite service period of the awards (usually the vesting period) on a straight-line basis. We estimate fair value of stock option grants using the Black-Scholes option pricing model. We estimate the fair value using assumptions, including the risk-free interest rate, the expected volatility of a peer group of similar companies, the expected term of the awards and the expected dividend yield. These estimates involve inherent uncertainties and the application of management's judgment. If factors change and different assumptions are used, our stock-based compensation expense could be materially different in the future.

**Income Taxes**

We account for income taxes under the asset and liability method, which requires the recognition of deferred tax assets and liabilities for the expected future tax consequences of events that have been included in the consolidated financial statements. Under this method, deferred tax assets and liabilities are determined on the basis of the differences between the consolidated financial statements and tax basis of assets and liabilities using enacted tax rates in effect for the year in which the differences are expected to reverse. The effect of a change in tax rates on deferred tax assets and liabilities is recognized as income in the period that includes the enactment date.

We recognize net deferred tax assets to the extent that we believe these assets are more likely than not to be realized. In making such a determination, we consider all available positive and negative evidence, including future reversals of existing taxable temporary differences, projected future taxable income, tax-planning strategies and results of recent operations. If we determine that we would be able to realize the deferred tax assets in the future in excess of their net recorded amount, we would make an adjustment to the deferred tax asset valuation allowance, which would reduce the provision for income taxes.

We record uncertain tax positions on the basis of a two-step process whereby (1) we determine whether it is more likely than not that the tax positions will be sustained on the basis of the technical merits of the position and (2) for those tax positions that meet the more-likely-than-not recognition threshold, we recognize the largest amount of tax benefit that is more than

50

% likely to be realized upon ultimate settlement with the related tax authority. We recognize interest and penalties related to unrecognized tax benefits within income tax expense. Any accrued interest and penalties are included within the related tax liability.

**Net Loss Per Share**

Basic net loss per share is calculated by dividing the net loss attributable to common stockholders by the weighted average number of common shares outstanding for the period, without consideration for common stock equivalents. Diluted net loss per share attributable to common stockholders is calculated by dividing the net loss attributable to common stockholders by the weighted average number of common stock and common stock equivalents outstanding for the period determined using the treasury-stock method. Dilutive common stock equivalents are comprised of convertible preferred stock, warrants for common stock, options and restricted stock units outstanding under our stock option plans and inducement grants and estimated shares to be purchased under our 2015 Employee Stock Purchase Plan (the 2015 ESPP). For all periods presented, there is no difference in the number of shares used to calculate basic and diluted shares outstanding due to our net loss position.

Potentially dilutive securities not included in the calculation of diluted net loss per share because to do so would be anti-dilutive are as follows (in common share equivalents):

| | Years Ended December 31, | | |
|---|---|---|---|
| | 2023 | 2022 | 2021 |
| Common stock warrants | 5,864 | 13,760 | 13,760 |
| Common stock options and restricted stock units | 4,020,154 | 3,077,608 | 1,420,050 |
| Employee stock purchase plan | 41,862 | 34,588 | 2,045 |
| Total | 4,067,880 | 3,125,956 | 1,435,855 |

The following table summarizes our net loss per share (in thousands, except per share data):

| | Years Ended December 31, | | |
|---|---|---|---|
| | 2023 | 2022 | 2021 |
| **Numerator:** | | | |
| Net loss attributable to aTyr Pharma, Inc. | $ ( 50,389 ) | $ ( 45,338 ) | $ ( 33,768 ) |
| **Denominator:** | | | |
| Shares used in computing net loss per share, basic and diluted | 53,606,488 | 28,419,569 | 19,080,878 |
| **Net loss per share - basic and diluted** | $ ( 0.94 ) | $ ( 1.60 ) | $ ( 1.77 ) |

**Recent Accounting Pronouncements**

In June 2016, the Financial Accounting Standards Board issued Accounting Standards Update (ASU) No. 2016-13, *Financial Instruments – Credit Losses* (Topic 326), to provide financial statement users with more decision-useful information about the expected credit losses on financial instruments and other commitments to extend credit held by a reporting entity at each reporting date. To achieve this objective, the amendments in Topic 326 replace the incurred loss impairment methodology in current U.S. GAAP with a methodology that reflects expected credit losses and requires consideration of a broader range of reasonable and supportable information to inform credit loss estimates. Topic 326 is effective for fiscal years beginning after December 15, 2022, including interim periods within those fiscal years for smaller reporting companies. We adopted Topic 326 on January 1, 2023 . The adoption did not have a material impact on our consolidated financial statements.

In December 2023, the FASB, issued ASU 2023-09, *Improvements to Income Tax Disclosures,* which requires entities to disclose disaggregated information about their effective tax rate reconciliation as well as expanded information on income taxes paid by jurisdiction. The disclosure requirements will be applied on a prospective basis, with the option to apply them retrospectively. The standard is effective for fiscal years beginning after December 15, 2024, with early adoption permitted. We are currently evaluating the disclosure requirements related to the new standard.

**3. Fair Value Measurements**

The carrying amounts of cash equivalents, prepaid and other assets, accounts payable and accrued liabilities are considered to be representative of their respective fair values because of the short-term nature of those instruments. Investment securities are recorded at fair value.

The accounting guidance defines fair value, establishes a consistent framework for measuring fair value and expands disclosure for each major asset and liability category measured at fair value on either a recurring or nonrecurring basis. Fair value is defined as an exit price, representing the amount that would be received to sell an asset or paid to transfer a liability in an orderly transaction between market participants. As such, fair value is a market-based measurement that should be determined based on assumptions that market participants would use in pricing an asset or liability. As a basis for considering such assumptions, the accounting guidance establishes a three-tier fair value hierarchy, which prioritizes the inputs used in measuring fair value as follows:

Level 1: Observable inputs such as quoted prices in active markets.

Level 2: Inputs, other than the quoted prices in active markets that are observable either directly or indirectly.

Level 3: Unobservable inputs in which there is little or no market data, which require the reporting entity to develop its own assumptions.

Financial assets measured at fair value on a recurring basis consist of investment securities. Investment securities are recorded at fair value, defined as the exit price in the principal market in which we would transact, representing the amount that would be received to sell an asset or paid to transfer a liability in an orderly transaction between market participants. Level 2 securities are valued using quoted market prices for similar instruments, non-binding market prices that are corroborated by observable market data, or discounted cash flow techniques and include our investments in commercial paper, corporate debt securities and U.S. government agencies. We have no financial liabilities measured at fair value on a recurring basis. None of our non-financial assets and liabilities are recorded at fair value on a non-recurring basis. No transfers between levels have occurred during the periods presented.

Assets measured at fair value on a recurring basis are as follows (in thousands):

| | | Fair Value Measurements Using | | |
|---|---|---|---|---|
| | Total | Quoted Prices in Active Markets for Identical Assets (Level 1) | Significant Other Observable Inputs (Level 2) | Significant Unobservable Inputs (Level 3) |
| **As of December 31, 2023** | | | | |
| Assets: | | | | |
| Current: | | | | |
| Cash equivalents | $ 21,626 | $ 21,626 | $ — | $ — |
| Available-for-sale investments: | | | | |
| Commercial paper | 31,198 | — | 31,198 | — |
| Corporate debt securities | 27,578 | — | 27,578 | — |
| U.S. government agencies | 16,846 | — | 16,846 | — |
| Total available-for-sale investments | 75,622 | — | 75,622 | — |
| Total assets measured at fair value | $ 97,248 | $ 21,626 | $ 75,622 | $ — |

| | Total | Fair Value Measurements Using Quoted Prices in Active Markets for Identical Assets (Level 1) | Significant Other Observable Inputs (Level 2) | Significant Unobservable Inputs (Level 3) |
|---|---|---|---|---|
| **As of December 31, 2022** | | | | |
| Assets: | | | | |
| Current: | | | | |
| Cash equivalents | $ 8,585 | $ 8,585 | $ — | $ — |
| Available-for-sale investments: | | | | |
| Commercial paper | 28,074 | — | 28,074 | — |
| Corporate debt securities | 26,094 | — | 26,094 | — |
| Municipal bonds | 1,997 | — | 1,997 | — |
| Total available-for-sale investments | 56,165 | — | 56,165 | — |
| Total assets measured at fair value | $ 64,750 | $ 8,585 | $ 56,165 | $ — |

As of December 31, 2023 and 2022, available-for-sale investments are detailed as follows (in thousands):

| | Contractual Maturity | December 31, 2023 Gross Amortized Cost | Gross Unrealized Gains | Gross Unrealized Losses | Market Value |
|---|---|---|---|---|---|
| Available-for-sale investments: | | | | | |
| Commercial paper | Within 1 year | $ 31,198 | $ 14 | $ ( 14 ) | $ 31,198 |
| Corporate debt securities | Within 2 years | 27,607 | 12 | ( 41 ) | 27,578 |
| U.S. government agencies | Within 1 year | 16,841 | 26 | ( 21 ) | 16,846 |
| | | $ 75,646 | $ 52 | $ ( 76 ) | $ 75,622 |

| | Contractual Maturity | December 31, 2022 Gross Amortized Cost | Gross Unrealized Gains | Gross Unrealized Losses | Market Value |
|---|---|---|---|---|---|
| Available-for-sale investments: | | | | | |
| Commercial paper | Within 1 year | $ 28,121 | $ — | $ ( 47 ) | $ 28,074 |

| | | | | | |
|---|---|---|---|---|---|
| Corporate debt securities | Within 2 years | 26,401 | — | (307) | 26,094 |
| Municipal bonds | Within 1 year | 2,026 | — | (29) | 1,997 |
| | | $ 56,548 | $ — | $ (383) | $ 56,165 |

We evaluate our available-for-sale debt securities for credit losses when the amortized cost basis exceeds fair value. The credit-related portion of unrealized losses, and any subsequent improvements, are recorded in interest income through an allowance account. Unrealized gains and losses that are not credit-related are included in accumulated other comprehensive income (loss). When evaluating an investment for impairment, we review factors such as the severity of the impairment, changes in underlying credit ratings, our intent to sell or the likelihood that we would be required to sell the investment before its anticipated recovery in market value and the probability that the scheduled cash payments will continue to be made. Based on our evaluation, we did not record allowance for credit losses in the consolidated statement of operations during the year ended December 31, 2023.

As of December 31, 2023, all available-for-sale investments had a variety of effective maturity dates of less than two years . As of December 31, 2023, $

74.6
million of our short-term investments had maturities less than one year and $

1.0
million had maturities greater than one year. As of December 31, 2023,

19
out of

25
available-for-sale investments were in a gross unrealized loss position of which

one
available-for-sale investment with a market value of $

2.0
million was in such position for greater than 12 months .

As of December 31, 2023 and 2022, accrued interest receivable on available-for-sale securities was $

0.3
million and $

0.2
million, respectively.

**4. License, Collaboration and Other Agreements**

*Kyorin Pharmaceutical Co., Ltd.*

In January 2020, we entered into a collaboration and license agreement (Kyorin Agreement) with Kyorin Pharmaceutical Co., Ltd. (Kyorin) for the development and commercialization of efzofitimod for the treatment of interstitial lung disease (ILD) in Japan. Under the Kyorin Agreement, Kyorin received an exclusive right to develop and commercialize efzofitimod in Japan for all forms of ILD, and is obligated to fund all research, development, regulatory, marketing and commercialization activities in Japan. In 2020, Kyorin conducted and funded a Phase 1 clinical trial of efzofitimod (known as KRP-R120 in Japan). The Phase 1 clinical trial was a placebo-controlled clinical trial to evaluate the safety, pharmacokinetics (PK) and immunogenicity of efzofitimod in 32 healthy Japanese male volunteers. Efzofitimod was observed to be generally well-tolerated with no drug-related serious adverse events, and PK findings were consistent with previous studies of efzofitimod. Kyorin is also participating in the EFZO-FIT study as the local sponsor in Japan. In February 2023, Kyorin dosed the first patient in Japan in the EFZO-FIT study which triggered a $

10.0
million milestone payment to us. To date, the Kyorin Agreement has generated $

20.0
million in upfront and milestone payments to us and we are eligible to receive up to an additional $

155.0
million in the aggregate upon achievement of certain development, regulatory and sales milestones, as well as tiered royalties on any net sales in Japan.

Either party may terminate the Kyorin Agreement in the event that the other party breaches the agreement and fails to cure the breach, becomes insolvent or challenges certain of the intellectual property rights licensed under the agreement.

We assessed our license and collaboration with Kyorin in accordance with Topic 606 and concluded that Kyorin is a customer. We identified the following performance obligations under the Kyorin Agreement: 1) the license of efzofitimod for ILD in Japan; and 2) free clinical trial material for Kyorin's Phase 1 clinical trial. Kyorin is participating in the EFZO-FIT study and received approval from the Pharmaceuticals and Medical Devices Agency (PMDA) to commence the EFZO-FIT study in Japan in December 2022. Additionally, in February 2023, Kyorin dosed the first patient in Japan in the EFZO-FIT study which triggered a $

10.0
million milestone payment to us. We recognized this $

10.0
million milestone payment as revenue during the year ended December 2022, as we determined the milestone became probable of achievement with Kyorin having scheduled site visits for patient screenings by that time. We received this $

10.0
million milestone payment in February 2023. During the year ended December 31, 2023, we recognized $

0.4
million in collaboration revenue from Kyorin for drug product material sold to Kyorin for the Japan portion of the EFZO-FIT study.

The remaining milestones and royalty payments under the Kyorin Agreement are variable consideration. Since the milestone payments are binary in nature, we will use the "most-likely" method to evaluate whether the milestones should be included as revenue. We will constrain these amounts until they become probable of being achieved. The royalties are dependent on future sales by Kyorin which are at the full discretion of Kyorin. Accordingly, we will apply a constraint to these amounts until the future sale sales have occurred.

**5. Balance Sheet Details**

Prepaid expenses consist of the following (in thousands):

| | December 31, 2023 | 2022 |
|---|---|---|
| Prepaid clinical and research expense | $ 1,475 | $ 334 |
| Prepaid manufacturing expenses | 125 | 2,049 |
| Other prepaid expenses | 790 | 567 |
| | $ 2,390 | $ 2,950 |

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

| | December 31, 2023 | 2022 |
|---|---|---|

| | | |
|---|---|---|
| Computer and office equipment | $ 448 | $ 620 |
| Scientific and laboratory equipment | 4,051 | 4,379 |
| Tenant improvements | 5,653 | 4,414 |
| | 10,152 | 9,413 |
| Less accumulated depreciation and amortization | ( 4,621 ) | ( 6,354 ) |
| | $ 5,531 | $ 3,059 |

During the years ended December 31, 2023, 2022 and 2021, depreciation expense was $

0.6
million, $

0.2
million and $

0.5
million, respectively.

Accrued expenses consist of the following (in thousands):

| | December 31, 2023 | 2022 |
|---|---|---|
| Accrued salaries, wages and benefits | $ 2,706 | $ 2,781 |
| Accrued clinical and manufacturing | 7,753 | 5,151 |
| Other accrued expenses | 1,100 | 1,930 |
| | $ 11,559 | $ 9,862 |

**6. Commitments and Contingencies**

**Operating Leases**

*Corporate Headquarters Facility Lease*

In May 2022, we entered into a lease (the Lease) with San Diego Creekside, LLC (Landlord), as lessor, pursuant to which we agreed to lease from Landlord approximately

23,696

rentable square feet (subject to increase pursuant to the terms of the Lease) of office and laboratory space. The term of the lease (the Lease Term) commenced on March 20, 2023 (the Lease Commencement Date) and will continue for 124 months from the Lease Commencement Date. We also have one option to extend the Lease Term for five years . Base rent during such extension period would be at the fair market rent for the Premises (as that term is defined in the Lease). Under the terms of the Lease, the base rent during the first 12 months of the Lease Term will be $

5.75

per square foot of rentable area per month, subject to certain upward adjustments of approximately

3.0

% annually. We are entitled to an allowance of up to $

5.3

million for tenant improvements of which as of December 31, 2023 we had received $

5.0

million, and we received the remaining $

0.3

million in February 2024. We provided a $

0.7

million security deposit in the form of a letter of credit which is included in restricted cash as of December 31, 2023. During the second quarter of 2023, additional common area amenities were completed by the Landlord which provided us with access to approximately

1,500

additional rentable square feet. As a result, our base rent increased for this additional rentable square feet at the same monthly base rent per rentable square foot as contemplated in the Lease.

*Previous Corporate Headquarters Facility Lease*

Our operating lease for our previous corporate headquarters was subject to base lease payments, additional charges for common area maintenance and other costs and it expired in May 2023.

Future minimum payments under the facility lease and reconciliation to the operating lease liability as of December 31, 2023 were as follows (in thousands):

| | Operating Leases |
|---|---|
| 2024 | $ 1,949 |
| 2025 | 1,975 |
| 2026 | 1,923 |

| | |
|---|---|
| 2027 | 1,942 |
| 2028 and thereafter | 11,968 |
| Less: Amount representing interest | (6,289) |
| Present value of lease payments | 13,468 |
| Less: Current portion of operating lease liability | (831) |
| Less: Tenant improvement allowance not yet received | (298) |
| Long-term operating lease liability, net of current portion | $ 12,339 |

Operating lease expense was $ 1.9 million, $ 1.5 million and $ 1.0 million for the years ended December 31, 2023, 2022 and 2021, respectively. As of December 31, 2023 and 2022, the weighted average remaining lease term was 9.4 years and 9.9 years, respectively. As of December 31, 2023 and 2022, the weighted average discount rate for each period was 8.8 %.

**Financing Leases**

In April 2022, we entered into a master financing lease agreement to lease various research and development and information technology equipment over a 48-month term. Future minimum payments under the financing lease and reconciliation to the financing lease liability as of December 31, 2023 were as follows (in thousands):

| | Financing Leases |
|---|---|
| 2024 | $ 634 |
| 2025 | 634 |
| 2026 | 676 |
| 2027 | 264 |
| Less: Amount representing interest | ( 283 ) |
| Present value of lease payments | 1,925 |
| Less: Current portion of financing lease liability | ( 497 ) |
| Long-term financing lease liability, net of current portion | $ 1,428 |

As of December 31, 2023 and 2022, the weighted-average remaining lease term was 3.0 years and 3.7 years, respectively and the weighted-average discount rate was

8.3
% and

7.9
%, respectively. We provided a $

2.7
million deposit to be held as collateral for the leased equipment, and this deposit is included in restricted cash as of December 31, 2023.

**7. Stockholders' Equity**

**Underwritten Follow-On Public Offerings**

In February 2023, we completed an underwritten follow-on public offering of

23,125,000
shares of our common stock, including the partial exercise of the underwriters' option to purchase additional shares, at a price to the public of $

2.25
per share. The total net proceeds from the offering were approximately $

48.1
million, after deducting underwriting discounts, commissions and offering expenses payable by us.

In September 2021, we completed an underwritten follow-on public offering of

10,781,250
shares of our common stock, including the full exercise of the underwriters' option to purchase additional shares, at a price to the public of $

8.00
per share. The total net proceeds from the offering were approximately $

80.6
million, after deducting underwriting discounts, commissions and offering expenses payable by us.

**At-the-Market Offering Programs**

In April 2022, we entered into an Open Market Sale Agreement[SM] with Jefferies implementing the Jefferies ATM Offering Program, pursuant to which we may offer and sell, from time to time and at our option, up to an aggregate of $

65.0
million of shares of our common stock through Jefferies, acting as sales agent. Jefferies is entitled to a fixed commission rate of up to

3.0
% of the gross sales proceeds of shares sold under the Jefferies ATM Offering Program. During the year ended December 31, 2022, we sold an aggregate of

1,421,627
shares of common stock at a weighted-average price of $

3.09
per share for net proceeds of approximately $

4.0
million under the Jefferies ATM Offering Program. During the year ended December 31, 2023, we sold an aggregate of

10,530,795
shares of common stock at a weighted-average price of $

1.82
per share for net proceeds of approximately $

18.4
million under the Jefferies ATM Offering Program.

In March 2021, we entered into a Capital on Demand™ Sales Agreement with JonesTrading Institutional Services LLC (JonesTrading) for an at-the-market offering program (the JonesTrading ATM Offering Program), pursuant to which we were entitled to sell from time to time, at our option, up to an aggregate of $

25.0
million of shares of our common stock through JonesTrading, as sales agent or principal. JonesTrading was entitled to a commission at a fixed rate of up to

3.0
% of the gross proceeds. During 2021, we sold an aggregate of

986,267
shares of common stock at a weighted-average price of $

4.75
per share for net proceeds of $

4.4
million under the JonesTrading ATM Offering Program. In April 2022, we terminated the JonesTrading ATM Offering Program. During 2022 and prior to termination in April 2022, we sold an aggregate of

260,455
shares of common stock at a weighted-average price of $

6.07
per share for net proceeds of approximately $

1.5
million under the JonesTrading ATM Offering Program.

In May 2019, we entered into a sales agreement with H.C. Wainwright & Co., LLC (Wainwright) for an ATM Offering Program (the Wainwright ATM Offering Program) under which we could offer and sell shares of our common stock having an aggregate offering price of up to $

10.0
million. In November 2020, we amended our sales agreement with Wainwright to increase the amount of the ATM Offering Program to $

20.0
million. Wainwright was entitled to a commission at a fixed commission rate equal to

3
% of the gross proceeds. In March 2021, the ATM Offering Program with Wainwright automatically terminated upon the issuance and sale of all of the shares having an aggregate offering price of $

20.0
million. Prior to the termination of the sales agreement with Wainwright, in 2021, we sold an aggregate of

1,988,254
shares of common stock at an average price of $

4.99
per share for net proceeds of $

9.6
million.

**Purchase Agreement**

In September 2020, we entered into a common stock purchase agreement (the Purchase Agreement) with Aspire Capital Fund, LLC (Aspire Capital), which provided that, upon the terms and subject to the conditions and limitations set forth therein, Aspire Capital was committed to purchase up to an aggregate of $

20.0

million of shares of our common stock at our request from time to time during the 30 month term of the Purchase Agreement. In 2021, we sold an aggregate of

3,000,000

shares of common stock at a weighted-average price of $

5.09

per share for net proceeds of $

15.2

million under the Purchase Agreement. There were

no

issuances or sales under the Purchase Agreement during the years ended December 31, 2023 and December 31, 2022, respectively, and this agreement was terminated on March 11, 2023.

**2014 Stock Plan**

We adopted a stock option plan in 2007 (the 2007 Plan), which was subsequently amended, restated and renamed in July 2014 (the 2014 Plan) to provide for the incentive stock options, nonstatutory stock options, stock and rights to purchase restricted stock to eligible recipients. Recipients of incentive stock options are eligible to purchase shares of our common stock at an exercise price equal to no less than the estimated fair market value of such stock on the date of grant. The maximum term of options under the 2014 Plan is ten years . Options granted generally vest over four years . We ceased granting under the 2014 Plan after our IPO in May 2015. Shares underlying any awards under the 2014 Plan that are forfeited, canceled, reacquired by us prior to vesting, satisfied without the issuance of stock or otherwise terminated (other than by exercise) will be added to shares available for issuance under our 2015 Stock Option and Incentive Plan (the 2015 Stock Plan), which became effective in May 2015.

**2015 Stock Plan**

Total shares available for issuance under the 2015 Stock Plan as of December 31, 2023 were

3,964,555

. Shares underlying any awards under the 2015 Stock Plan that are forfeited, canceled, reacquired by us prior to vesting, satisfied without the issuance of stock or otherwise terminated (other than by exercise) will be added to shares available for issuance under the 2015 Stock Plan.

The maximum term of options granted under 2015 Stock Plan is ten years . For an initial grant to an employee,

25

% of the options generally vest on the first anniversary of the original vesting date, with the balance vesting monthly over the remaining three years. For subsequent grants to an employee, the options generally vest monthly over a four-year term.

**Inducement Plan**

In March 2022, our board of directors approved and adopted our 2022 Inducement Plan (our Inducement Plan). Awards granted under our Inducement Plan are in accordance with Nasdaq Listing Rule 5635(c)(4). A total of

300,000

shares of our common stock were initially reserved for the issuance under our Inducement Plan.

The maximum term of options granted under our Inducement Plan is ten years . Each option vests over a period of four years , with

25

% of the shares vesting on the one-year anniversary of the applicable vesting commencement date and the remaining

75

% vesting in equal monthly installments over three years , thereafter, subject to continuous employment.

During the year ended December 31, 2023, we granted nonstatutory stock options under our Inducement Plan to purchase an aggregate of

23,400

shares of our common stock, with a weighted-average exercise price of $

2.26

per share as inducement awards to new employees.

**2015 Employee Stock Purchase Plan**

As of December 31, 2023, total shares reserved for issuance under the 2015 ESPP were

727,311

.

**Stock-based Compensation**

***Stock Options***

Stock option activity is summarized as follows:

| | Number of Outstanding Stock Options | Weighted-Average Exercise Price | Weighted Remaining Contractual Term | Aggregate Intrinsic Value |
|---|---|---|---|---|
| Outstanding as of December 31, 2022 | 2,956,170 | $ 7.45 | | |
| Granted | 1,112,885 | $ 2.21 | | |
| Canceled/forfeited/expired | (112,228) | $ 6.42 | | |
| Outstanding as of December 31, 2023 | 3,956,827 | $ 6.00 | 7.94 | $ — |

The assumptions used in the Black-Scholes option pricing model to determine the fair value of the employee stock option grants were as follows:

| | Years Ended December 31, | | |
|---|---|---|---|
| | 2023 | 2022 | 2021 |
| Expected term (in years) | 5.51 – 6.09 | 5.98 – 6.08 | 5.50 – 6.08 |
| Risk-free interest rate | 3.58% – 4.5% | 1.7% – 4.2% | 0.6% – 1.3% |
| Expected volatility | 81.5% – 83.0% | 84.2% – 86.5% | 86.3% – 104.8% |
| Expected dividend yield | 0.0% | 0.0% | 0.0% |

The assumptions used in the Black-Scholes option pricing model to determine the fair value of the ESPP offering were as follows:

| | Years Ended December 31, | | |
|---|---|---|---|
| | 2023 | 2022 | 2021 |
| Expected term (in years) | 0.50 | 0.50 | 0.50 |
| Risk-free interest rate | 4.54% – 5.38% | 0.06% – 4.54% | 0.04% – 0.12% |
| Expected volatility | 40.9% – 58.5% | 51.9% – 95.9% | 89.7% – 108.12% |
| Expected dividend yield | 0.0% | 0.0% | 0.0% |

*Expected term*. The expected term represents the period of time that options are expected to be outstanding. Because we do not have sufficient history of exercise behavior, we determine the expected life assumption using the simplified method, which is an average of the contractual term of the option and its vesting period.

*Risk-free interest rate.* We base the risk-free interest rate assumption on the U.S. Treasury's rates for U.S. Treasury zero-coupon bonds with maturities similar to those of the expected term of the award being valued.

*Expected volatility.* The expected volatility assumption is based on our historical volatility as well as the volatilities of a peer group of similar companies whose share prices are publicly available. The peer group was developed based on companies in the biotechnology industry.

*Expected dividend yield.* We base the expected dividend yield assumption on the fact that we have never paid cash dividends and have no present intention to pay cash dividends.

***Restricted Stock Units***

Occasionally, we grant restricted stock units to employees. The fair value of restricted stock is determined by the closing price of our common stock reported on the Nasdaq Capital Market on the date of grant. Restricted stock unit activity is summarized as follows:

| | Number of Outstanding Restricted Stock Units | Weighted-Average Grant Date Fair Value |
|---|---|---|

| | | |
|---|---|---|
| Balance as of December 31, 2022 | 121,438 | $ 5.09 |
| Released | ( 58,111 ) | $ 4.69 |
| Balance as of December 31, 2023 | 63,327 | $ 5.45 |

The allocation of stock-based compensation for all options, including performance options with market condition and restricted stock units is as follows (in thousands):

| | Years Ended December 31, | | |
|---|---|---|---|
| | 2023 | 2022 | 2021 |
| Research and development | $ 600 | $ 528 | $ 295 |
| General and administrative | 2,000 | 1,626 | 1,319 |
| Total stock-based compensation expense | $ 2,600 | $ 2,154 | $ 1,614 |

The weighted-average grant date fair value per share of stock options granted by us, during the years ended December 31, 2023, 2022 and 2021 was $

1.59

, $

2.49

and $

3.82

, respectively. The total grant date fair value of restricted stock units granted by us during the years ended December 31, 2023, 2022, and 2021 was approximately $

0

, $

597,000

and $

16,000

, respectively. The aggregate intrinsic value of stock options exercised during the years ended December 31, 2023, 2022 and 2021 was approximately $

0

, $

1,000

and $

80,000

, respectively. The fair value of restricted stock units released during the years ended December 31, 2023, 2022 and 2021 was approximately $

123,875

, $

6,000

and $

31,000

, respectively. As of December 31, 2023, total unrecognized share-based compensation expense related to unvested stock options and restricted stock units was approximately $

4.6

million and $

0.2

million, respectively. As of December 31, 2023, these unrecognized costs for options and restricted stock units are expected to be recognized ratably over a weighted-average period of approximately 2.3 years and 2.0 years, respectively.

***Warrants***

Warrants outstanding for the purchase of common stock as of December 31, 2023 were as follows:

| Number Outstanding | Exercise Price Per Share | Expiration Date |
|---|---|---|
| 2,978 | $ 50.37 | June 2024 |
| 2,886 | $ 51.98 | December 2024 |
| 5,864 | | |

**Common Stock Reserved for Future Issuance**

Common stock reserved for future issuance was as follows:

| | December 31, 2023 |
|---|---|
| Common stock warrants | 5,864 |

| | |
|---|---|
| Common stock options and restricted stock units | 4,020,154 |
| Shares available under the 2015 equity incentive plan | 3,964,555 |
| Shares available under the 2022 inducement plan | 95,367 |
| Shares available under the employee stock purchase plan | 727,311 |
| | 8,813,251 |

**8. Income Tax**

Pretax losses were generated by both domestic and foreign operations as follows (in thousands):

| | Years Ended December 31, | | |
|---|---|---|---|
| | 2023 | 2022 | 2021 |
| United States | $ (49,967) | $ (45,086) | $ (33,316) |
| Foreign | (428) | (254) | (458) |
| Worldwide pre-tax loss | $ (50,395) | $ (45,340) | $ (33,774) |

For the years ended December 31, 2023, 2022, and 2021, we did

no

t record a provision for income taxes due to a full valuation allowance against our deferred taxes. A reconciliation of the expected statutory federal income tax provision to the actual income tax provision is summarized as follows (in thousands):

| | Years Ended December 31, | | |
|---|---|---|---|
| | 2023 | 2022 | 2021 |
| Expected income taxes benefit at federal statutory rate | $ (10,583) | $ (9,521) | $ (7,093) |
| State income taxes, net of federal benefit | (2,171) | (380) | (2,313) |
| Permanent items and other | 172 | 438 | 592 |
| Stock compensation | 91 | 44 | 90 |
| Research credits | (5,336) | (4,415) | (1,253) |
| Unrecognized tax benefits | 5,209 | 2,454 | 500 |

| | | | |
|---|---|---|---|
| Foreign rate differential | 19 | 11 | 21 |
| Change in tax rate | ( 5 ) | 34 | 52 |
| Change in valuation allowance | 12,604 | 11,335 | 9,404 |
| Income tax (benefit) expense | $ — | $ — | $ — |

Deferred income taxes are provided for temporary differences in recognizing certain income and expense items for financial and tax reporting purposes. The deferred tax assets consisted primarily of the income tax benefits from net operating loss (NOL) carryforwards, research and development credits and capitalized research and development expenses, along with other accruals and reserves. Valuation allowances of $

108.0
million and $

95.5
million as of December 31, 2023 and 2022, respectively, have been recorded to offset deferred tax assets as realization of such assets does not meet the more-likely-than-not threshold under ASC 740, *Accounting for Income Taxes*.

Significant components of our deferred tax assets are summarized as follows (in thousands):

| | December 31, | |
|---|---|---|
| | 2023 | 2022 |
| Deferred tax assets: | | |
| Net operating loss carryforwards | $ 60,090 | $ 52,752 |
| Capitalized research and development expenses | 25,922 | 22,576 |
| Research credits and other state credits | 18,246 | 16,021 |
| Intangible assets | 1,093 | 1,278 |
| Reserve and accruals | 522 | 596 |
| Share-based compensation expense | 1,821 | 1,628 |
| Lease liability | 1,709 | 2,157 |
| Total tax assets | 109,403 | 97,008 |
| Valuation allowance | ( 107,989 ) | ( 95,484 ) |
| Total deferred tax assets | $ 1,414 | $ 1,524 |
| Deferred tax liabilities: | | |
| Right of use lease assets | ( 1,414 ) | ( 1,524 ) |
| Total deferred tax liabilities | ( 1,414 ) | ( 1,524 ) |
| Net deferred tax assets | $ — | $ — |

The Tax Cuts and Jobs Act of 2017 requires taxpayers to capitalize and amortize research and development (R&D) expenditures under section 174 for tax years beginning after December 31, 2021. This rule was effective at the beginning of 2022 which resulted in a capitalization of R&D costs of approximately $

44.2
million and $

38.8

million during the years ended December 31, 2023 and 2022, respectively. We will amortize these costs for tax purposes over 5 years if the R&D was performed in the U.S. and over 15 years if the R&D was performed outside the U.S.

As of December 31, 2023, we had federal NOL carryforwards of approximately $

257.4
million, with $

144.9
million of NOLs generated after December 31, 2017 carrying forward indefinitely and $

112.5
million of NOLs that will begin to expire in 2025 . NOL carryforwards generated after January 1, 2018 are subject to an 80% of taxable income limitation in accordance with the Tax Cuts and Jobs Act of 2017. We had state net operating loss carryforwards of approximately $

225.3
million, and foreign net operating loss carryforwards of $

9.4
million. The state net operating losses began to expire in 2025 . The foreign net operating losses carry over indefinitely.

As of December 31, 2023, we had federal and state research and development credit carryforwards of approximately $

9.3
million and $

5.8
million, respectively, which begin to expire in 2026 for both federal and state purposes. We had $18

.4
million of federal Orphan Drug Credits as of December 31, 2023, which will begin to expire in 2035 .

Utilization of the domestic NOL and research and development credit carryforwards may be subject to a substantial annual limitation due to ownership change limitations that may have occurred or that could occur in the future, as required by Sections 382 and 383 of the Internal Revenue Code of 1986, as amended (the Code), as well as similar state and foreign provisions. These ownership changes may limit the amount of NOL and research and development credit carryforwards that can be utilized annually to offset future taxable income and tax, respectively. In general, an “ownership change” as defined by Section 382 of the Code results from a transaction or series of transactions over a three-year period resulting in an ownership change of more than

50
percentage points of the outstanding stock of a company by certain stockholders. Since the Company’s formation, we raised capital through the issuance of capital stock on several occasions which on its own or combined with the purchasing stockholders’ subsequent disposition of those shares, has resulted in such an ownership change, and could result in an ownership change in the future.

Upon the occurrence of an ownership change under Section 382 as outlined above, utilization of the NOL and research and development credit carryforwards become subject to an annual limitation under Section 382 of the Code, which is determined by first multiplying the value of our stock at the time of the ownership change by the applicable long-term, tax-exempt rate, which could be subject to additional adjustments. Any limitation may result in expiration of a portion of our NOL or research and development credit carryforwards before utilization. Due to the existence of the valuation allowance, any impact to the NOL and research and development

tax credit carryforwards from Section 382 analysis will be offset by a corresponding adjustment to valuation allowance, resulting in no tax provision impact.

We recognize a tax benefit from an uncertain tax position when it is more likely than not that the position will be sustained upon examination, including resolutions of any related appeals or litigation processes, based on the technical merits. Income tax positions must meet a more-likely-than-not recognition threshold to be recognized.

Our practice is to recognize interest and penalties related to income tax matters in income tax expense. We had

no

accrual for interest and penalties on our balance sheet and had not recognized interest or penalties in the consolidated statements of operations for the years ended December 31, 2023, 2022 and 2021.

Due to the existence of the valuation allowance, future changes in unrecognized tax benefits will not impact our effective tax rate.

Uncertain tax positions are evaluated based upon the facts and circumstances that exist at each reporting period. Subsequent changes in judgment based upon new information may lead to changes in recognition, derecognition, and measurement. Adjustments may result, for example, upon resolution of an issue with the taxing authorities, or expiration of a statute of limitations barring an assessment for an issue.

The activity related to our unrecognized tax benefits is summarized as follows (in thousands):

| | December 31, | | |
|---|---|---|---|
| | 2023 | 2022 | 2021 |
| Balance as of beginning of year | $ 25,145 | $ 22,232 | $ 21,707 |
| Increase (decrease) related to prior year tax positions | ( 483 ) | ( 48 ) | ( 9 ) |
| Increase related to current year tax positions | 5,416 | 2,961 | 534 |
| Balance as of end of year | $ 30,078 | $ 25,145 | $ 22,232 |

We do

no

t anticipate that the amount of unrecognized tax benefits as of December 31, 2023 will change within the next twelve months.

We are subject to taxation in the United States, Hong Kong and state jurisdictions. Our tax years from inception are subject to examination by the United States, Hong Kong and various state authorities due to carry forward of unutilized NOLs and research and development credits.

**9. Employee Benefits**

**401(k) Plan**

We maintain a defined contribution 401(k) plan available to eligible employees. Employee contributions are voluntary and are determined on an individual basis, limited to the maximum amount allowable under federal tax regulations. In April 2015 , our board of directors approved a policy, beginning on June 1, 2015 , to match employee contributions equal to

50

% of the participant's contribution of up to a maximum of

6

% of the participant's annual salary. We made discretionary contributions totaling $

0.2

million during each of the years ended December 31, 2023, 2022 and 2021.

**10. Subsequent Events**

*Sales of Common Stock through the Jefferies ATM Offering Program*

From January 1, 2024 through March 13, 2024, we sold an aggregate of 4,441,509 shares of common stock at a weighted-average price of $1.75 per share through the Jefferies ATM Offering Program for net proceeds of $7.6 million.

**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**

We maintain disclosure controls and procedures, as defined in Rules 13a-15(e) and 15d-15(e) under the Exchange Act that are designed to ensure that information required to be disclosed in our periodic and current reports that we file with the SEC is recorded, processed, summarized and reported within the time periods specified in the SEC's rules and forms, and that such information is accumulated and communicated to our management, including our Principal Executive Officer and Principal Financial Officer, as appropriate, to allow timely decisions regarding required disclosure. In designing and evaluating the disclosure controls and procedures, management recognizes that any controls and procedures, no matter how well designed and operated, can provide only reasonable and not absolute assurance of achieving the desired control objectives. In reaching a reasonable level of assurance, management necessarily is required to apply its judgment in evaluating the cost-benefit relationship of possible controls and procedures. In addition, the design of any system of controls also is based in part upon certain assumptions about the likelihood of future events, and there can be no assurance that any design will succeed in achieving its stated goals under all potential future conditions; over time, control may become inadequate because of changes in conditions, or the degree of compliance with policies or procedures may deteriorate. Because of the inherent limitations in a cost-effective control system, misstatements due to error or fraud may occur and not be detected.

We carried out an evaluation, under the supervision and with the participation of our management, including our Principal Executive Officer and Principal Financial Officer, of the effectiveness of the design and operation of our disclosure controls and procedures, as defined in Rules 13a-15(e) and 15d-15(e) under the Exchange Act. Based on this evaluation, our Principal Executive Officer and Principal Financial Officer concluded that our disclosure controls and procedures were effective at the reasonable assurance level as of December 31, 2023.

**Management's Report on Internal Control Over Financial Reporting**

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

As of December 31, 2023, our management assessed the effectiveness of our internal control over financial reporting using the criteria set forth by the Committee of Sponsoring Organizations of the Treadway Commission in Internal Control – 2013 Integrated Framework (2013 Framework). Based on this assessment, our management concluded that our internal control over financial reporting was effective as of December 31, 2023.

This Annual Report does not include an attestation report of our registered public accounting firm under Section 404(b) of the Sarbanes-Oxley Act (15 U.S.C. 7262(b)).

**Changes in Internal Control Over Financial Reporting**

During the quarter ended December 31, 2023, there have been no changes in our internal control over financial reporting, as such term is defined in Rules 13a-15(f) and 15d-15(f) promulgated under the Exchange Act, that have materially affected, or are reasonably likely to materially affect, our internal control over financial reporting.

**Item 9B. Other Information.**

None.

**Item 9C. Disclosure Regarding Foreign Jurisdictions that Prevent Inspections.**

Not applicable.

## PART III

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

Except as set forth below, the information required by this item will be contained in our Definitive Proxy Statement to be filed with the SEC in connection with our 2024 Annual Meeting of Stockholders within 120 days after the end of the fiscal year ended December 31, 2023, under the sections headed “Proposal 1 – Election of Directors,” “Executive Officers” and “Delinquent Section 16(a) Reports,” if any, and is incorporated herein by reference.

We have adopted a written code of ethics for directors, officers (including our principal executive officer, principal financial officer and principal accounting officer or controller, or persons performing similar functions) and employees, known as the Code of Business Conduct and Ethics. The Code of Business Conduct and Ethics is available on our website at *http://www.atyrpharma.com* under the Corporate Governance section of our Investors and Media page. If we make any amendments to, or grant any waivers from, the Code of Business Conduct and Ethics for any officer or director, we intend to satisfy our disclosure obligations, if any, with respect to such amendment or waiver by posting such information on our website or in a Current Report on Form 8-K. Information contained in, or that can be accessed through, our website is not incorporated by reference herein, and you should not consider information on our website to be part of this Annual Report.

**Item 11. Executive Compensation.**

The information required by this item will be contained in our Definitive Proxy Statement under the section headed “Executive Officers,” 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 contained in our Definitive Proxy Statement, under the sections headed “Equity Compensation Plan Information and “Security Ownership of Certain Beneficial Owners and Management and Related Stockholder Matters,” and is incorporated herein by reference.

**Item 13. Certain Relationships and Related Transactions, and Director Independence.**

The information required by this item will be contained in our Definitive Proxy Statement, under the sections headed “Proposal 1 – Election of Directors” and “Certain Relationships and Related Transactions,” and is incorporated herein by reference.

**Item 14. Principal Accountant Fees and Services.**

The information required by this item will be contained in our Definitive Proxy Statement, under the section headed “Proposal 2 – Ratification of the Independent Registered Public Accounting Firm,” and is incorporated herein by reference.

## PART IV

**Item 15. Exhibit and Financial Statement Schedules.**

(a) The following documents are filed as part of this Annual Report.

1. *Index list to Financial Statements*:



2. *Financial Statement Schedules*.

Schedules have been omitted as all required information has been disclosed in the consolidated financial statements and related footnotes.

3. *Exhibits.*

The Exhibits listed in the Exhibit Index are filed as a part of this Annual Report.

## EXHIBIT INDEX

| Exhibit Number | Exhibit Title | Incorporated by Reference | | | |
|---|---|---|---|---|---|
| | | Form | File No. | Exhibit | Filing Date |
| 3.1 | Restated Certificate of Incorporation of the Registrant | 10-Q | 001-37378 | 3.1 | November 14, 2022 |
| 3.2 | Certificate of Amendment to Restated Certificate of Incorporation of the Registrant | 8-K | 001-37378 | 3.1 | June 28, 2019 |
| 3.3 | Certificate of Amendment to Restated Certificate of Incorporation of the Registrant | 10-Q | 001-37378 | 3.3 | May 12, 2020 |
| 3.4 | Certificate of Amendment to Restated Certificate of Incorporation of the Registrant | 8-K | 001-37378 | 3.1 | May 4, 2021 |
| 3.5 | Certificate of Amendment to Restated Certificate of Incorporation of the Registrant | 8-K | 001-37378 | 3.1 | April 29, 2022 |
| 3.6 | Certificate of Amendment to Restated Certificate of Incorporation of the Registrant | 8-K | 001-37378 | 3.1 | May 19, 2023 |
| 3.7 | Amended and Restated Bylaws of the Registrant | 10-Q | 333-203272 | 3.6 | November 14, 2022 |
| 4.1 | Specimen Common Stock Certificate | S-1/A | 333-203272 | 4.1 | April 27, 2015 |
| 4.2 | Warrant to Purchase Stock issued to Silicon Valley Bank on June 30, 2017 | 10-Q | 001-37378 | 4.7 | August 14, 2017 |
| 4.3 | Warrant to Purchase Stock issued to Solar Capital Ltd on June 30, 2017 | 10-Q | 001-37378 | 4.8 | August 14, 2017 |
| 4.4 | Warrant to Purchase Stock issued to Silicon Valley Bank on December 22, 2017 | 10-K | 001-37378 | 4.8 | March 20, 2018 |
| 4.5 | Warrant to Purchase Stock issued to Solar Capital Ltd on December 22, 2017 | 10-K | 001-37378 | 4.9 | March 20, 2018 |
| 4.6 | Description of Common Stock of the Registrant | — | — | — | Filed herewith |
| 10.1* | 2014 Stock Plan and forms of agreements thereunder | S-1/A | 333-203272 | 10.1 | April 27, 2015 |
| 10.2* | 2015 Stock Option and Incentive Plan, as amended | 8-K | 001-37378 | 10.1 | May 19, 2023 |
| 10.3* | Forms of agreement under 2015 Stock Option and Incentive Plan | S-1/A | 333-203272 | 10.2 | April 27, 2015 |
| 10.4 | Form of Indemnification Agreement entered into between the Registrant and its directors | S-1/A | 333-203272 | 10.12 | April 27, 2015 |
| 10.5 | Form of Indemnification Agreement entered into between the Registrant and its officers | S-1/A | 333-203272 | 10.13 | April 27, 2015 |
| 10.6* | Senior Executive Cash Incentive Bonus Plan | 8-K | 001-37378 | 10.1 | January 29, 2016 |
| 10.7* | Executive Severance and Change in Control Policy | 10-K | 001-37378 | 10.16 | March 30, 2016 |
| 10.8* | Registrant's Non-Qualified Stock Option Agreement for Non-Plan Inducement Grant | 10-Q | 001-37378 | 10.1 | November 14, 2016 |
| 10.9* | Employment Agreement, dated November 1, 2017, by and between the Registrant and Sanjay S. Shukla, M.D., M.S. | 10-Q | 001-37378 | 10.4 | November 14, 2017 |
| 10.10* | Employment Offer Letter by and between the Registrant and Jill M. Broadfoot, dated July 16, 2018 | 8-K | 001-37378 | 10.1 | August 1, 2018 |

| Exhibit Number | Exhibit Title | Incorporated by Reference | | | |
|---|---|---|---|---|---|
| | | Form | File No. | Exhibit | Filing Date |
| 10.11* | Employment Offer Letter by and between the Registrant and Ms. Nancy Krueger, Esq., dated October 7, 2014 | 10-Q | 001-37378 | 10.2 | May 14, 2019 |
| 10.12† | Collaboration and License Agreement by and between the Registrant and Kyorin Pharmaceutical Co., Ltd., dated January 6, 2020 | S-1/A | 333-235951 | 10.21 | February 3, 2020 |
| 10.13* | First Amendment to Employment Agreement dated February 5, 2021, by and the between the Registrant and Sanjay S. Shukla, M.D., M.S. | 10-K | 001-37378 | 10.19 | March 24, 2021 |
| 10.14* | aTyr Pharma, Inc. 2015 Employee Stock Purchase Plan, as amended | 8-K | 001-37378 | 10.2 | April 29, 2022 |
| 10.15* | aTyr Pharma, Inc. 2022 Inducement Plan | 10-Q | 001-37378 | 10.3 | May 10, 2022 |
| 10.16* | Forms of Grant Notice and Stock Option Agreement under aTyr Pharma, Inc. 2022 Inducement Plan | 10-Q | 001-37378 | 10.4 | May 10, 2022 |
| 10.17 | Open Market Sale Agreement℠ dated April 22, 2022 by and between the Registrant and Jefferies LLC | 8-K | 001-37378 | 1.1 | April 22, 2022 |
| 10.18 | Lease dated May 12, 2022, by and between the Registrant and San Diego Creekside, LLC | 8-K | 001-37378 | 10.1 | May 16, 2022 |
| 10.19* | Non-Employee Director Compensation Policy | — | — | — | Filed herewith |
| 21.1 | Subsidiaries of the Registrant | S-1 | 333-203272 | 21.1 | April 6, 2015 |
| 23.1 | Consent of Independent Registered Public Accounting Firm | — | — | — | Filed herewith |
| 24.1 | Power of Attorney (included on signature page to this Annual Report) | — | — | — | Filed herewith |
| 97.1 | aTyr Pharma, Inc. Incentive Compensation Recoupment Policy | — | — | — | Filed herewith |
| 31.1 | Certification of Principal Executive Officer required by Rule 13a-14(a) or Rule 15d-14(a) of the Securities Exchange Act of 1934, as adopted pursuant to Section 302 of the Sarbanes-Oxley Act of 2002 | — | — | — | Filed herewith |
| 31.2 | Certification of Principal Financial Officer required by Rule 13a-14(a) or Rule 15d-14(a) of the Securities Exchange Act of 1934, as adopted pursuant to Section 302 of the Sarbanes-Oxley Act of 2002 | — | — | — | Filed herewith |
| 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 | — | — | — | Filed herewith |
| 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 | — | — | — | Filed herewith |
| 101.INS | Inline XBRL Instance Document | — | — | — | Filed herewith |
| 101.SCH | Inline XBRL Taxonomy Extension Schema With Embedded Linkbases Document | — | — | — | Filed herewith |
| 104 | Cover Page Interactive Data File (embedded within the Inline XBRL and contained in Exhibits 101) | — | — | — | Filed herewith |

* Indicates a management contract or compensatory plan, contract or arrangement.

† Certain portions have been omitted because the Registrant has determined that the information is not material and is the type that the Registrant treats as private or confidential.

# The information in Exhibits 32.1 and 32.2 shall not be deemed “filed” for purposes of Section 18 of the Exchange Act, or otherwise subject to the liabilities of that section, nor shall it be deemed incorporated by reference in any filing under the Securities Act or the Exchange Act (including this Annual Report on Form 10-K), unless the Registrant specifically incorporates the foregoing information into those documents by reference.

**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, the registrant has duly caused this report to be signed on its behalf by the undersigned, thereunto duly authorized.

aTyr Pharma, Inc.

Date: March 14, 2024

By /s/ Sanjay S. Shukla
Sanjay S. Shukla, M.D., M.S.
President, Chief Executive Officer and Director
*(Principal Executive Officer)*

**POWER OF ATTORNEY**

KNOW ALL PERSONS BY THESE PRESENTS, that each person whose signature appears below constitutes and appoints Sanjay S. Shukla, M.D., M.S. and Jill M. Broadfoot, jointly and severally, and each of them, his or her true and lawful attorneys-in-fact, each with full power of substitution, for him or her in any and all capacities, to sign any amendments to this Annual Report on Form 10-K and to file the same, with exhibits thereto and other documents in connection therewith, with the Securities and Exchange Commission, hereby ratifying and confirming all that each of said attorneys-in-fact or their substitute or substitutes may do or cause to be done by virtue hereof.

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

| Signature | Title | Date |
|---|---|---|
| /s/ Sanjay S. Shukla<br>Sanjay S. Shukla, M.D., M.S. | President, Chief Executive Officer and Director<br>*(Principal Executive Officer)* | March 14, 2024 |
| /s/ Jill M. Broadfoot<br>Jill M. Broadfoot | Chief Financial Officer<br>*(Principal Financial and Accounting Officer)* | March 14, 2024 |
| /s/ Timothy P. Coughlin<br>Timothy P. Coughlin | Chairman of the Board | March 14, 2024 |
| John K. Clarke | Director | March 14, 2024 |
| /s/ Jane A. Gross<br>Jane A. Gross, Ph.D. | Director | March 14, 2024 |
| /s/ Svetlana Lucas<br>Svetlana Lucas, Ph.D. | Director | March 14, 2024 |
| /s/ Paul Schimmel<br>Paul Schimmel, Ph.D. | Director | March 14, 2024 |
| /s/ Sara L. Zaknoen<br>Sara L. Zaknoen | Director | March 14, 2024 |

**Exhibit 4.6**

## DESCRIPTION OF COMMON STOCK

The following summary description of the common stock of aTyr Pharma, Inc. (we, our or us) is based on the provisions of our amended and restated certificate of incorporation, as well as our amended and restated bylaws, and the applicable provisions of the Delaware General Corporation Law (DGCL). This information is qualified entirely by reference to the applicable provisions of our amended and restated certificate of incorporation, amended and restated bylaws, and the DGCL. Our amended and restated certificate of incorporation and amended and restated bylaws have previously been filed as exhibits with the Securities and Exchange Commission (SEC).

### Common Stock

The holders of our common stock are entitled to one vote for each share held on all matters submitted to a vote of the stockholders. The holders of our common stock do not have any cumulative voting rights. Holders of our common stock are entitled to receive ratably any dividends declared by our Board of Directors out of funds legally available for that purpose, subject to any preferential dividend rights of any outstanding preferred stock. Our common stock has no preemptive rights, conversion rights or other subscription rights or redemption or sinking fund provisions.

In the event of our liquidation, dissolution or winding up, holders of our common stock will be entitled to share ratably in all assets remaining after payment of all debts and other liabilities and any liquidation preference of any outstanding preferred stock.

### Preferred Stock

The rights of holders of our common stock described above, are and will be subject to, and may be adversely affected by, the rights of currently authorized and outstanding preferred stock and any preferred stock that we may designate and issue in the future. Our Board of Directors is authorized to issue up to 5,000,000 shares of undesignated preferred stock in one or more series without stockholder approval. Our Board of Directors may determine the rights, preferences, privileges and restrictions, including voting rights, dividend rights, conversion rights, redemption privileges and liquidation preferences, of each series of preferred stock, any or all of which may be more favorable than the rights of our common stock. The issuance of shares of undesignated preferred stock could decrease the amount of earnings and assets available for distribution to holders of shares of common stock. The issuance may also adversely affect the rights and powers, including voting rights, of these holders and may have the effect of delaying, deterring or preventing a change in control of us. The existence of authorized but unissued shares of undesignated preferred stock may enable our Board of Directors to render more difficult or to discourage an attempt to obtain control of us by means of a merger, tender offer, proxy contest or otherwise. For example, if in the due exercise of its fiduciary obligations, our Board of Directors were to determine that a takeover proposal is not in the best interests of us or our stockholders, our Board of Directors could cause shares of preferred stock to be issued without stockholder approval in one or more private offerings or other transactions that might dilute the voting or other rights of the proposed acquirer, stockholder or stockholder group.

### Provisions of our Amended and Restated Certificate of Incorporation and Amended and Restated Bylaws and Delaware Anti-Takeover Law

Certain provisions of the DGCL and of our amended and restated certificate of incorporation and amended and restated bylaws could have the effect of delaying, deferring or discouraging another party from acquiring control of us. These provisions, which are summarized below, are expected to discourage

certain types of coercive takeover practices and inadequate takeover bids and, as a consequence, they might also inhibit temporary fluctuations in the market price of our common stock that often result from actual or rumored hostile takeover attempts. These provisions are also designed in part to encourage anyone seeking to acquire control of us to first negotiate with our Board of Directors. These provisions might also have the effect of preventing changes in our management. It is possible that these provisions could make it more difficult to accomplish transactions that stockholders might otherwise deem to be in their best interests. However, we believe that the advantages gained by protecting our ability to negotiate with any unsolicited and potentially unfriendly acquirer outweigh the disadvantages of discouraging such proposals, including those priced above the then-current market value of our common stock, because, among other reasons, the negotiation of such proposals could improve their terms.

***Board Composition and Filling Vacancies***. Our amended and restated certificate of incorporation provides for the division of our Board of Directors into three classes serving staggered three-year terms, with one class being elected each year. Our amended and restated certificate of incorporation also provides that directors may be removed only for cause and then only by the affirmative vote of the holders of 75% or more of the shares then entitled to vote at an election of directors. Furthermore, any vacancy on our Board of Directors, however occurring, including a vacancy resulting from an increase in the size of our board, may only be filled by the affirmative vote of a majority of our directors then in office even if less than a quorum.

***No Written Consent of Stockholders***. Our amended and restated certificate of incorporation provides that all stockholder actions are required to be taken by a vote of the stockholders at an annual or special meeting, and that stockholders may not take any action by written consent in lieu of a meeting.

***Meetings of Stockholders***. Our amended and restated certificate of incorporation and amended and restated bylaws provide that only a majority of the members of our Board of Directors then in office may call special meetings of stockholders and only those matters set forth in the notice of the special meeting may be considered or acted upon at a special meeting of stockholders. Our amended and restated bylaws limit the business that may be conducted at an annual meeting of stockholders to those matters properly brought before the meeting.

***Advance Notice Requirements***. Our amended and restated bylaws establish advance notice procedures with regard to stockholder proposals relating to the nomination of candidates for election as directors or new business to be brought before meetings of our stockholders. These procedures provide that notice of stockholder proposals must be timely given in writing to our corporate secretary prior to the meeting at which the action is to be taken.

***Amendment to Amended and Restated Certificate of Incorporation and Amended and Restated Bylaws***. As required by the DGCL, any amendment of our amended and restated certificate of incorporation must first be approved by a majority of our Board of Directors, and if required by law or our amended and restated certificate of incorporation, must thereafter be approved by a majority of the outstanding shares entitled to vote on the amendment and a majority of the outstanding shares of each class entitled to vote thereon as a class, except that the amendment of the provisions relating to stockholder action, board composition, limitation of liability and the amendment of our certificate of incorporation must be approved by not less than 75% of the outstanding shares entitled to vote on the amendment, and not less than 75% of the outstanding shares of each class entitled to vote thereon as a class. Our amended and restated bylaws may be amended by the affirmative vote of a majority of the directors then in office, subject to any limitations set forth in the amended and restated bylaws; and may also be amended by the affirmative vote of at least 75% of the outstanding shares entitled to vote on the amendment, or, if our Board of Directors recommends that the stockholders approve the amendment, by the affirmative vote of the majority of the outstanding shares entitled to vote on the amendment, in each case voting together as a single class.

***Delaware Anti-Takeover Law***. We are subject to the provisions of Section 203 of the DGCL. In general, Section 203 prohibits a publicly held Delaware corporation from engaging in a "business combination" with an "interested stockholder" for a three-year period following the time that this stockholder becomes an interested stockholder, unless the business combination is approved in a prescribed manner. Under Section 203, a business combination between a corporation and an interested stockholder is prohibited unless it satisfies one of the following conditions:

- before the stockholder became interested, the board of directors approved either the business combination or the transaction which resulted in the stockholder becoming an interested stockholder;

- upon consummation of the transaction which resulted in the stockholder becoming an interested stockholder, the interested stockholder owned at least 85% of the voting stock of the corporation outstanding at the time the transaction commenced, excluding for purposes of determining the voting stock outstanding, shares owned by persons who are directors and also officers, and employee stock plans, in some instances; or

- at or after the time the stockholder became interested, the business combination was approved by the board of directors of the corporation and authorized at an annual or special meeting of the stockholders by the affirmative vote of at least two-thirds of the outstanding voting stock which is not owned by the interested stockholder.

Section 203 defines a business combination to include:

- any merger or consolidation involving the corporation and the interested stockholder;

- any sale, transfer, lease, pledge or other disposition involving the interested stockholder of 10% or more of the assets of the corporation;

- subject to exceptions, any transaction that results in the issuance or transfer by the corporation of any stock of the corporation to the interested stockholder;

- subject to exceptions, any transaction involving the corporation that has the effect of increasing the proportionate share of the stock of any class or series of the corporation beneficially owned by the interested stockholder; and

- the receipt by the interested stockholder of the benefit of any loans, advances, guarantees, pledges or other financial benefits provided by or through the corporation.

In general, Section 203 defines an interested stockholder as any entity or person beneficially owning or having owned in the past three years 15% or more of the outstanding voting stock of the corporation and any entity or person affiliated with or controlling or controlled by the entity or person.

***Exclusive Jurisdiction of Certain Actions***. Our amended and restated bylaws provide that, unless we consent in writing to the selection of an alternative forum, the Court of Chancery of the State of Delaware shall be the sole and exclusive forum for (i) any derivative action or proceeding brought on our behalf, (ii) any action asserting a claim of breach of a fiduciary duty owed by any of our directors, officers or other employees to us or our stockholders, (iii) any action asserting a claim arising pursuant to any provision of the DGCL, our amended and restated certificate of incorporation or our amended and restated bylaws, or

(iv) any action asserting a claim against us governed by the internal affairs doctrine. Although we believe this provision benefits us by providing increased consistency in the application of Delaware law in the types of lawsuits to which it applies, the provision may have the effect of discouraging lawsuits against our directors and officers. This choice of forum provision does not apply to suits brought to enforce a duty or liability created by the Securities Act of 1933, as amended, or the Exchange Act, or any other claim for which the federal courts have exclusive jurisdiction.

This choice of forum provision may limit a stockholder's ability to bring certain claims in a judicial forum that it finds favorable for disputes with us or any of our directors, officers, other employees or stockholders, which may discourage lawsuits with respect to such claims, although our stockholders will not be deemed to have waived our compliance with federal securities laws and the rules and regulations thereunder. If a court were to find this choice of forum provision to be inapplicable or unenforceable in an action, we may incur additional costs associated with resolving such action in other jurisdictions, which could adversely affect our business and financial condition.

**EXHIBIT 10.19**

**ATYR PHARMA, INC.**

**NON-EMPLOYEE DIRECTOR COMPENSATION POLICY**

The purpose of this Non-Employee Director Compensation Policy (the "Policy") of aTyr Pharma, Inc., a Delaware corporation (the "Company"), is to provide a total compensation package that enables the Company to attract and retain, on a long-term basis, high-caliber directors who are not employees or officers of the Company. In furtherance of this purpose, effective as of the effective time of the registration statement for the Company's initial firm commitment underwritten public offering of equity securities (the "Effective Date"), all non-employee directors shall be paid compensation for services provided to the Company as set forth below:

**Cash Retainers**

Annual Retainer for Board Membership: $40,000.00 for general availability and participation in meetings and conference calls of our Board of Directors (the "Board"). No additional compensation for attending individual Board meetings.

Additional Annual Retainers for Committee Membership and Service as Chairperson:

Board Chairperson: $35,000.00

Audit Committee Chairperson: $25,000.00

Audit Committee member: $8,000.00

Compensation Committee Chairperson: $12,000.00

Compensation Committee member: $6,000.00

Nominating and Corporate Governance Committee Chairperson: $8,000.00

Nominating and Corporate Governance Committee member: $4,000.00

No additional compensation for attending individual committee meetings.

All cash retainers will be paid quarterly, in arrears, or upon the earlier resignation or removal of the non-employee director. Cash retainers owing to non-employee directors shall be annualized, meaning that with respect to non-employee directors who join the Board during the calendar year, and with respect to all non-employee directors for 2015, such amounts shall be pro-rated based on the number of calendar days served by such director.

**Equity Retainers**

Initial Equity Grant: One-time option grant to each new non-employee director upon his/her election to the Board after the Effective Date to purchase 48,000 shares of the Company's common

stock, par value $0.001 per share ("Common Stock"). Such initial equity grant shall vest in equal monthly installments during the 36 months following the grant date, subject to the director's continued service on the Board.

On the date of each Annual Meeting of Stockholders: Annual option grant to each non-employee director serving on the Board immediately following the Company's annual meeting of stockholders to purchase 24,000 shares of Common Stock. Such annual equity grant shall vest on the earlier of the one-year anniversary of the grant date and the Company's next annual meeting of stockholders, subject to the director's continued service on the Board.

Additional Equity Grants: In addition to the foregoing, non-employee directors may also be granted such additional stock options in such amounts and on such dates as the Board may recommend.

The form of option agreement will give directors up to one year following cessation of service as a director to exercise the options (to the extent vested at the date of such cessation), provided that the director has not been removed for cause.

All of the foregoing option grants will have an exercise price equal to the fair market value of a share of Common Stock on the date of grant.

**Expenses**

The Company shall reimburse all reasonable out-of-pocket expenses incurred by non-employee directors in attending Board and committee meetings.

**Exhibit 23.1**

**CONSENT OF INDEPENDENT REGISTERED PUBLIC ACCOUNTING FIRM**

We consent to the incorporation by reference in the following Registration Statements:

(1) Registration Statement (Form S-1 No. 333-248905) of aTyr Pharma, Inc.,

(2) Registration Statements (Form S-3 Nos. 333-220463, 333-263585 and 333-275455) of aTyr Pharma, Inc.,

(3) Registration Statement (Form S-8 No. 333-203955) pertaining to the ATYR PHARMA, INC. 2014 STOCK PLAN, ATYR PHARMA, INC. 2015 STOCK OPTION AND INCENTIVE PLAN, and the ATYR PHARMA, INC. 2015 EMPLOYEE STOCK PURCHASE PLAN,

(4) Registration Statements (Form S-8 Nos. 333-210543 and 333-223865) pertaining to the ATYR PHARMA, INC. 2015 STOCK OPTION AND INCENTIVE PLAN, and the ATYR PHARMA, INC. 2015 EMPLOYEE STOCK PURCHASE PLAN,

(5) Registration Statement (Form S-8 No. 333-216880) pertaining to the ATYR PHARMA, INC. 2015 STOCK OPTION AND INCENTIVE PLAN, ATYR PHARMA, INC. 2015 EMPLOYEE STOCK PURCHASE PLAN, and the NON-QUALIFIED STOCK OPTION INDUCEMENT AWARD,

(6) Registration Statement (Form S-8 No. 333-231594) pertaining to the ATYR PHARMA, INC. 2015 STOCK OPTION AND INCENTIVE PLAN, AS AMENDED, ATYR PHARMA, INC. 2015 EMPLOYEE STOCK PURCHASE PLAN, and the NON-QUALIFIED STOCK OPTION AGREEMENT FOR NON-PLAN INDUCEMENT GRANT,

(7) Registration Statements (Form S-8 Nos. 333-248090, 333-256145 and 333-273876) pertaining to the ATYR PHARMA, INC. 2015 STOCK OPTION AND INCENTIVE PLAN, AS AMENDED, and

(8) Registration Statement (Form S-8 No. 333-264866) pertaining to the ATYR PHARMA, INC. 2015 STOCK OPTION AND INCENTIVE PLAN, AS AMENDED, ATYR PHARMA, INC. 2015 EMPLOYEE STOCK PURCHASE PLAN, AS AMENDED, ATYR PHARMA, INC NON-QUALIFIED STOCK OPTION AGREEMENT FOR NON-PLAN INDUCEMENT GRANTS, and the ATYR PHARMA, INC. 2022 INDUCEMENT PLAN;

of our report dated March 14, 2024, with respect to the consolidated financial statements of aTyr Pharma, Inc. included in this Annual Report (Form 10-K) of aTyr Pharma, Inc. for the year ended December 31, 2023.

/s/ Ernst & Young LLP

San Diego, California

March 14, 2024

**Exhibit 31.1**

**CERTIFICATION PURSUANT TO**
**RULE 13a-14(a) AND 15d-14(a) OF THE SECURITIES EXCHANGE ACT OF 1934,**
**AS ADOPTED PURSUANT TO SECTION 302 OF THE SARBANES-OXLEY ACT OF 2002**

I, Sanjay S. Shukla, certify that:

1. I have reviewed this Annual Report on Form 10-K of aTyr Pharma, Inc.;

2. Based on my knowledge, this report does not contain any untrue statement of a material fact or omit to state a material fact necessary to make the statements made, in light of the circumstances under which such statements were made, not misleading with respect to the period covered by this report;

3. Based on my knowledge, the financial statements, and other financial information included in this report, fairly present in all material respects the financial condition, results of operations and cash flows of the registrant as of, and for, the periods presented in this report;

4. The registrant's other certifying officer(s) and I are responsible for establishing and maintaining disclosure controls and procedures (as defined in Exchange Act Rules 13a-15(e) and 15d-15(e)) and internal control over financial reporting (as defined in Exchange Act Rules 13a-15(f) and 15d-15(f)) for the registrant and have:

a) Designed such disclosure controls and procedures, or caused such disclosure controls and procedures to be designed under our supervision, to ensure that material information relating to the registrant, including its consolidated subsidiaries, is made known to us by others within those entities, particularly during the period in which this report is being prepared;

b) Designed such internal control over financial reporting, or caused such internal control over financial reporting to be designed under our supervision, to provide reasonable assurance regarding the reliability of financial reporting and the preparation of financial statements for external purposes in accordance with generally accepted accounting principles;

c) Evaluated the effectiveness of the registrant's disclosure controls and procedures and presented in this report our conclusions about the effectiveness of the disclosure controls and procedures, as of the end of the period covered by this report based on such evaluation; and

d) Disclosed in this report any change in the registrant's internal control over financial reporting that occurred during the registrant's most recent fiscal quarter (the registrant's fourth fiscal quarter in the case of an annual report) that has materially affected, or is reasonably likely to materially affect, the registrant's internal control over financial reporting; and

5. The registrant's other certifying officer(s) and I have disclosed, based on our most recent evaluation of internal control over financial reporting, to the registrant's auditors and the audit committee of the registrant's board of directors (or persons performing the equivalent functions):

a) All significant deficiencies and material weaknesses in the design or operation of internal control over financial reporting which are reasonably likely to adversely affect the registrant's ability to record, process, summarize and report financial information; and

b) Any fraud, whether or not material, that involves management or other employees who have a significant role in the registrant's internal control over financial reporting.

Date: March 14, 2024

/s/ Sanjay S. Shukla
Sanjay S. Shukla, M.D., M.S.
President, Chief Executive Officer and Director
(Principal Executive Officer)

**Exhibit 31.2**

**CERTIFICATION PURSUANT TO**
**RULE 13a-14(a) AND 15d-14(a) OF THE SECURITIES EXCHANGE ACT OF 1934,**
**AS ADOPTED PURSUANT TO SECTION 302 OF THE SARBANES-OXLEY ACT OF 2002**

I, Jill M. Broadfoot, certify that:

1. I have reviewed this Annual Report on Form 10-K of aTyr Pharma, Inc.;

2. Based on my knowledge, this report does not contain any untrue statement of a material fact or omit to state a material fact necessary to make the statements made, in light of the circumstances under which such statements were made, not misleading with respect to the period covered by this report;

3. Based on my knowledge, the financial statements, and other financial information included in this report, fairly present in all material respects the financial condition, results of operations and cash flows of the registrant as of, and for, the periods presented in this report;

4. The registrant's other certifying officer(s) and I are responsible for establishing and maintaining disclosure controls and procedures (as defined in Exchange Act Rules 13a-15(e) and 15d-15(e)) and internal control over financial reporting (as defined in Exchange Act Rules 13a-15(f) and 15d-15(f)) for the registrant and have:

a) Designed such disclosure controls and procedures, or caused such disclosure controls and procedures to be designed under our supervision, to ensure that material information relating to the registrant, including its consolidated subsidiaries, is made known to us by others within those entities, particularly during the period in which this report is being prepared;

b) Designed such internal control over financial reporting, or caused such internal control over financial reporting to be designed under our supervision, to provide reasonable assurance regarding the reliability of financial reporting and the preparation of financial statements for external purposes in accordance with generally accepted accounting principles;

c) Evaluated the effectiveness of the registrant's disclosure controls and procedures and presented in this report our conclusions about the effectiveness of the disclosure controls and procedures, as of the end of the period covered by this report based on such evaluation; and

d) Disclosed in this report any change in the registrant's internal control over financial reporting that occurred during the registrant's most recent fiscal quarter (the registrant's fourth fiscal quarter in the case of an annual report) that has materially affected, or is reasonably likely to materially affect, the registrant's internal control over financial reporting; and

5. The registrant's other certifying officer(s) and I have disclosed, based on our most recent evaluation of internal control over financial reporting, to the registrant's auditors and the audit committee of the registrant's board of directors (or persons performing the equivalent functions):

a) All significant deficiencies and material weaknesses in the design or operation of internal control over financial reporting which are reasonably likely to adversely affect the registrant's ability to record, process, summarize and report financial information; and

b) Any fraud, whether or not material, that involves management or other employees who have a significant role in the registrant's internal control over financial reporting.

Date: March 14, 2024

/s/ Jill M. Broadfoot
Jill M. Broadfoot
Chief Financial Officer
(Principal Financial and Accounting Officer)

**Exhibit 32.1**

**CERTIFICATION PURSUANT TO 18 U.S.C. SECTION 1350, AS ADOPTED PURSUANT TO SECTION 906 OF THE SARBANES-OXLEY ACT OF 2002**

In connection with the Annual Report on Form 10-K of aTyr Pharma, Inc. (the "Company") for the year ended December 31, 2023, as filed with the Securities and Exchange Commission on the date hereof (the "Report"), I, Sanjay S. Shukla, President and Chief Executive Officer of the Company, 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, as amended (the "Exchange Act"); 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 14, 2024

/s/ Sanjay S. Shukla
Sanjay S. Shukla, M.D., M.S.
President, Chief Executive Officer and Director
(Principal Executive Officer)

The foregoing certification is being furnished solely to accompany the Report pursuant to 18 U.S.C. Section 1350, is not being filed for purposes of Section 18 of the Securities Exchange Act of 1934, and is not to be incorporated by reference into any filing of the Company, whether made before or after the date hereof, regardless of any general incorporation language in such filing.

**Exhibit 32.2**

**CERTIFICATION PURSUANT TO 18 U.S.C. SECTION 1350, AS ADOPTED PURSUANT TO SECTION 906 OF THE SARBANES-OXLEY ACT OF 2002**

In connection with the Annual Report on Form 10-K of aTyr Pharma, Inc. (the "Company") for the year ended December 31, 2023, as filed with the Securities and Exchange Commission on the date hereof (the "Report"), I, Jill M. Broadfoot, Chief Financial Officer of the Company, 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, as amended (the "Exchange Act"); 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 14, 2024

/s/ Jill M. Broadfoot
Jill M. Broadfoot
Chief Financial Officer
(Principal Financial and Accounting Officer)

The foregoing certification is being furnished solely to accompany the Report pursuant to 18 U.S.C. Section 1350, and is not being filed for purposes of Section 18 of the Securities Exchange Act of 1934, and is not to be incorporated by reference into any filing of the Company, whether made before or after the date hereof, regardless of any general incorporation language in such filing.

**EXHIBIT 97.1**

**ATYR PHARMA, INC.**

**INCENTIVE COMPENSATION RECOUPMENT POLICY**

**1. INTRODUCTION**

The Board of Directors (the "***Board***") of aTyr Pharma, Inc., a Delaware corporation (the "***Company***"), has determined that it is in the best interests of the Company and its stockholders to adopt this Incentive Compensation Recoupment Policy (this "***Policy***") providing for the Company's recoupment of Recoverable Incentive Compensation that is received by Covered Officers of the Company under certain circumstances. Certain capitalized terms used in this Policy have the meanings given to such terms in Section 3 below.

This Policy is designed to comply with, and shall be interpreted to be consistent with, Section 10D of the Exchange Act, Rule 10D-1 promulgated thereunder ("***Rule 10D-1***") and Nasdaq Listing Rule 5608 (the "***Listing Standards***").

**2. EFFECTIVE DATE**

This Policy shall apply to all Incentive Compensation that is received by a Covered Officer on or after October 2, 2023 (the "***Effective Date***"). Incentive Compensation is deemed "***received***" in the Company's fiscal period in which the Financial Reporting Measure specified in the Incentive Compensation award is attained, even if the payment or grant of such Incentive Compensation occurs after the end of that period.

**3. DEFINITIONS**

"***Accounting Restatement***" means an accounting restatement that the Company is required to prepare due to the material noncompliance of the Company with any financial reporting requirement under the securities laws, including any required accounting restatement to correct an error in previously issued financial statements that is material to the previously issued financial statements, or that would result in a material misstatement if the error were corrected in the current period or left uncorrected in the current period.

"***Accounting Restatement Date***" means the earlier to occur of (a) the date that the Board, a committee of the Board authorized to take such action, or the officer or officers of the Company authorized to take such action if Board action is not required, concludes, or reasonably should have concluded, that the Company is required to prepare an Accounting Restatement, or (b) the date that a court, regulator or other legally authorized body directs the Company to prepare an Accounting Restatement.

"***Administrator***" means the Compensation Committee or, in the absence of such committee, the Board.

"***Code***" means the U.S. Internal Revenue Code of 1986, as amended, and the regulations promulgated thereunder.

"***Compensation Committee***" means the Compensation Committee of the Board.

"***Covered Officer***" means each current and former Executive Officer.

"***Exchange***" means the Nasdaq Stock Market.

"***Exchange Act***" means the U.S. Securities Exchange Act of 1934, as amended.

"***Executive Officer***" means the Company's president, principal financial officer, principal accounting officer (or if there is no such accounting officer, the controller), any vice-president of the Company in charge of a principal business unit, division, or function (such as sales, administration, or finance), any other officer who performs a policy-making function, or any other person who performs similar policy-making functions for the Company. Executive officers of the Company's parent(s) or subsidiaries are deemed executive officers of the Company if they perform such policy-making functions for the Company. Policy-making function is not intended to include policy-making functions that are not significant. Identification of an executive officer for purposes of this Policy would include at a minimum executive officers identified pursuant to Item 401(b) of Regulation S-K promulgated under the Exchange Act.

"***Financial Reporting Measures***" means measures that are determined and presented in accordance with the accounting principles used in preparing the Company's financial statements, and any measures derived wholly or in part from such measures, including Company stock price and total stockholder return ("***TSR***"). A measure need not be presented in the Company's financial statements or included in a filing with the SEC in order to be a Financial Reporting Measure.

"***Incentive Compensation***" means any compensation that is granted, earned or vested based wholly or in part upon the attainment of a Financial Reporting Measure.

"***Lookback Period***" means the three completed fiscal years immediately preceding the Accounting Restatement Date, as well as any transition period (resulting from a change in the Company's fiscal year) within or immediately following those three completed fiscal years (except that a transition period of at least nine months shall count as a completed fiscal year). Notwithstanding the foregoing, the Lookback Period shall not include fiscal years completed prior to the Effective Date.

"***Recoverable Incentive Compensation***" means Incentive Compensation received by a Covered Officer during the Lookback Period that exceeds the amount of Incentive Compensation that would have been received had such amount been determined based on the Accounting Restatement, computed without regard to any taxes paid (*i.e.*, on a gross basis without regard to tax withholdings and other deductions). For any compensation plans or programs that take into account Incentive Compensation, the amount of Recoverable Incentive Compensation for purposes of this Policy shall include, without limitation, the amount contributed to any notional account based on Recoverable Incentive Compensation and any earnings to date on that notional amount. For any Incentive Compensation that is based on stock price or TSR, where the Recoverable Incentive Compensation is not subject to mathematical recalculation directly from the information in an Accounting Restatement, the Administrator will determine the amount of Recoverable Incentive Compensation based on a reasonable estimate of the effect of the Accounting Restatement on the stock price or TSR upon which the Incentive Compensation was received. The Company shall maintain documentation of the determination of that reasonable estimate and provide such documentation to the Exchange in accordance with the Listing Standards.

"***SEC***" means the U.S. Securities and Exchange Commission.

**4.RECOUPMENT**

**(a)Applicability of Policy.** This Policy applies to Incentive Compensation received by a Covered Officer (i) after beginning services as an Executive Officer, (ii) who served as an Executive Officer at any time during the performance period for such Incentive Compensation, (iii) while the Company had a class of securities listed on a national securities exchange or a national securities association, and (iv)

during the Lookback Period.

**(b)Recoupment Generally.** Pursuant to the provisions of this Policy, if there is an Accounting Restatement, the Company must reasonably promptly recoup the full amount of the Recoverable Incentive Compensation, unless the conditions of one or more subsections of Section 4(c) of this Policy are met and the Compensation Committee, or, if such committee does not consist solely of independent directors, a majority of the independent directors serving on the Board, has made a determination that recoupment would be impracticable. Recoupment is required regardless of whether the Covered Officer engaged in any misconduct and regardless of fault, and the Company's obligation to recoup Recoverable Incentive Compensation is not dependent on whether or when any restated financial statements are filed.

**(c)Impracticability of Recovery.** Recoupment may be determined to be impracticable if, and only if:

(i) the direct expense paid to a third party to assist in enforcing this Policy would exceed the amount of the applicable Recoverable Incentive Compensation; provided that, before concluding that it would be impracticable to recover any amount of Recoverable Incentive Compensation based on expense of enforcement, the Company shall make a reasonable attempt to recover such Recoverable Incentive Compensation, document such reasonable attempt(s) to recover, and provide that documentation to the Exchange in accordance with the Listing Standards; or

(ii) recoupment of the applicable Recoverable Incentive Compensation would likely cause an otherwise tax-qualified retirement plan, under which benefits are broadly available to employees of the Company, to fail to meet the requirements of Code Section 401(a)(13) or Code Section 411(a) and regulations thereunder.

**(d) Sources of Recoupment.** To the extent permitted by applicable law, the Administrator shall, in its sole discretion, determine the timing and method for recouping Recoverable Incentive Compensation hereunder, provided that such recoupment is undertaken reasonably promptly. The Administrator may, in its discretion, seek recoupment from a Covered Officer from any of the following sources or a combination thereof, whether the applicable compensation was approved, awarded, granted, payable or paid to the Covered Officer prior to, on or after the Effective Date: (i) direct repayment of Recoverable Incentive Compensation previously paid to the Covered Officer; (ii) cancelling prior cash or equity-based awards (whether vested or unvested and whether paid or unpaid); (iii) cancelling or offsetting against any planned future cash or equity-based awards; (iv) forfeiture of deferred compensation, subject to compliance with Code Section 409A; and (v) any other method authorized by applicable law or contract. Subject to compliance with any applicable law, the Administrator may effectuate recoupment under this Policy from any amount otherwise payable to the Covered Officer, including amounts payable to such individual under any otherwise applicable Company plan or program, *e.g.*, base salary, bonuses or commissions and compensation previously deferred by the Covered Officer. The Administrator need not utilize the same method of recovery for all Covered Officers or with respect to all types of Recoverable Incentive Compensation.

**(e)No Indemnification of Covered Officers.** Notwithstanding any indemnification agreement, applicable insurance policy or any other agreement or provision of the Company's certificate of incorporation or bylaws to the contrary, no Covered Officer shall be entitled to indemnification or advancement of expenses in connection with any enforcement of this Policy by the Company, including paying or reimbursing such Covered Officer for insurance premiums to cover potential obligations to the Company under this Policy.

**(f)Indemnification of Administrator.** Any members of the Administrator, and any other members of the Board who assist in the administration of this Policy, shall not be personally liable for any action, determination or interpretation made with respect to this Policy and shall be indemnified by the Company to the fullest extent under applicable law and Company policy with respect to any such action, determination or interpretation. The foregoing sentence shall not limit any other rights to indemnification of the members of the Board under applicable law or Company policy.

**(g)No "Good Reason" for Covered Officers.** Any action by the Company to recoup or any recoupment of Recoverable Incentive Compensation under this Policy from a Covered Officer shall not be deemed (i) "good reason" for resignation or to serve as a basis for a claim of constructive termination under any benefits or compensation arrangement applicable to such Covered Officer, or (ii) to constitute a breach of a contract or other arrangement to which such Covered Officer is party.

**5.Administration**

Except as specifically set forth herein, this Policy shall be administered by the Administrator. The Administrator shall have full and final authority to make any and all determinations required under this Policy. Any determination by the Administrator with respect to this Policy shall be final, conclusive and binding on all interested parties and need not be uniform with respect to each individual covered by this Policy. In carrying out the administration of this Policy, the Administrator is authorized and directed to consult with the full Board or such other committees of the Board as may be necessary or appropriate as to matters within the scope of such other committee's responsibility and authority. Subject to applicable law, the Administrator may authorize and empower any officer or employee of the Company to take any and all actions that the Administrator, in its sole discretion, deems necessary or appropriate to carry out the purpose and intent of this Policy (other than with respect to any recovery under this Policy involving such officer or employee).

**6.Severability**

If any provision of this Policy or the application of any such provision to a Covered Officer shall be adjudicated to be invalid, illegal or unenforceable in any respect, such invalidity, illegality or unenforceability shall not affect any other provisions of this Policy, and the invalid, illegal or unenforceable provisions shall be deemed amended to the minimum extent necessary to render any such provision or application enforceable.

**7.No Impairment of Other Remedies**

Nothing contained in this Policy, and no recoupment or recovery as contemplated herein, shall limit any claims, damages or other legal remedies the Company or any of its affiliates may have against a Covered Officer arising out of or resulting from any actions or omissions by the Covered Officer. This Policy does not preclude the Company from taking any other action to enforce a Covered Officer's obligations to the Company, including, without limitation, termination of employment and/or institution of civil proceedings. This Policy is in addition to the requirements of Section 304 of the Sarbanes-Oxley Act of 2002 ("**SOX 304**") that are applicable to the Company's Chief Executive Officer and Chief Financial Officer and to any other compensation recoupment policy and/or similar provisions in any employment, equity plan, equity award, or other individual agreement, to which the Company is a party or which the Company has adopted or may adopt and maintain from time to time; provided, however, that compensation recouped pursuant to this Policy shall not be duplicative of compensation recouped pursuant to SOX 304 or any such compensation recoupment policy and/or similar provisions in any such employment, equity plan, equity award, or other individual agreement except as may be required by law.

**8.Amendment; Termination**

The Administrator may amend, terminate or replace this Policy or any portion of this Policy at any time and from time to time in its sole discretion. The Administrator shall amend this Policy as it deems necessary to comply with applicable law or any Listing Standard.

**9.Successors**

This Policy shall be binding and enforceable against all Covered Officers and, to the extent required by Rule 10D-1 and/or the applicable Listing Standards, their beneficiaries, heirs, executors, administrators or other legal representatives.

**10.Required Filings**

The Company shall make any disclosures and filings with respect to this Policy that are required by law, including as required by the SEC.

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**aTyr Pharma, Inc.**

**Incentive Compensation Recoupment Policy**

**Form of Executive Acknowledgment**

I, the undersigned, agree and acknowledge that I am bound by, and subject to, the aTyr Pharma, Inc. Incentive Compensation Recoupment Policy, as may be amended, restated, supplemented or otherwise modified from time to time (the "***Policy***"). In the event of any inconsistency between the Policy and the terms of any employment agreement, offer letter or other individual agreement with aTyr Pharma, Inc. (the "***Company***") to which I am a party, or the terms of any compensation plan, program or agreement, whether or not written, under which any compensation has been granted, awarded, earned or paid to me, the terms of the Policy shall govern.

In the event that the Administrator (as defined in the Policy) determines that any compensation granted, awarded, earned or paid to me must be forfeited or reimbursed to the Company pursuant to the Policy, I will promptly take any action necessary to effectuate such forfeiture and/or reimbursement. I further agree and acknowledge that I am not entitled to indemnification, and hereby waive any right to advancement of expenses, in connection with any enforcement of the Policy by the Company.

**Agreed and Acknowledged:**

Name: _

Title: _

Date: _