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, 2022

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: 001-35610

ATOSSA THERAPEUTICS, INC.
(Exact name of registrant as specified in its charter)

Delaware	**26-4753208**
(State or other jurisdiction of incorporation or organization)	**(I.R.S. Employer Identification No.)**

107 Spring Street
Seattle, WA 98104
(Address of principal executive offices, including zip code)

Registrant's telephone number, including area code: (206) 588-0256

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

Title of each class	Trading symbol(s)	Name of each exchange on which registered
Common Stock, $0.18 par value	ATOS	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 Exchange Act. Yes ☐ No ☒

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

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

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

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

Emerging growth company ☐

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

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

If securities are registered pursuant to Section 12(b) of the Exchange 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. ☐ See Note. 1 below

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). ☐ See Note.1 below

Note 1. Disclosure is not being provided under this item pursuant to guidance issued by the staff of the Securities and Exchange Commission.

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

As of June 30, 2022, the last business day of the registrant's most recently completed second fiscal quarter, the aggregate market value of the voting and non-voting common equity held by non-affiliates was $137,982,260. Shares of common stock held by each officer and director and by each person who is known by the Company to own 10% or more of the outstanding common stock have been excluded, as such persons may be deemed to be affiliates of the Company. This determination of affiliate status is not necessarily a conclusive determination of affiliate status for other purposes.

The number of shares outstanding of the registrant's common stock, par value $0.18, as of March 16, 2023, was 126,624,110.

DOCUMENTS INCORPORATED BY REFERENCE

Certain information required to be disclosed in Part III of this Annual Report on Form 10-K (the Annual Report) incorporated by reference from the registrant's Definitive Proxy Statement for its 2023 Annual Meeting of Stockholders, which is expected to be filed no later than 120 days after the end of the fiscal year covered by this Annual Report.

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NOTE REGARDING FORWARD-LOOKING STATEMENTS

All statements made in this Annual Report on Form 10-K (this Annual Report) that are not statements of historical fact, including statements regarding guidance, industry prospects or future results of operations or financial positions, are forward-looking statements within the meaning of Section 27A of the Securities Act of 1933, as amended (the Securities Act) and Section 21E of the Securities Exchange Act of 1934, as amended (the Exchange Act). We have made these statements in reliance on the safe harbor provisions of the Private Securities Litigation Reform Act of 1995. These statements are subject to certain risks and uncertainties, which could cause actual results to differ materially from those projected or anticipated. Although we believe that our assumptions underlying our forward-looking statements are reasonable as of the date of this Annual Report we cannot assure you that the forward-looking statements set out in this Annual Report will prove to be accurate. We may identify these forward-looking statements by the use of forward-looking words, including, but not limited to, such as “expect,” “potential,” “continue,” “may,” “will,” “should,” “could,” “would,” “seek,” “intend,” “plan,” “estimate,” “anticipate,” “future,” “believe,” “design,” “predict,” “potential” or the negative versions of these words or other similar expressions. Forward-looking statements contained in this Annual Report include, but are not limited to, statements about:

- the impact of the ongoing COVID-19 pandemic and the degree to which the pandemic negatively impacts our supply chain, clinical trial enrollment and timing and our ability to access capital markets;
- the impact of inflation, rising interest rates, general economic slowdown or a recession, foreign exchange rate volatility, changes in monetary policy and increasing geopolitical instability on our business, our ability to access capital markets, our operating costs and our supply chain;
- whether we can obtain approval from the U.S. Food and Drug Administration (FDA), and foreign regulatory bodies, to commence our clinical trials, including our current and planned (Z)-endoxifen trials, and to sell, market and distribute our therapeutics under development;
- our ability to identify and partner with organizations to commercialize any of our products once they are approved for marketing;
- our ability to successfully initiate and complete clinical trials of our products under development, including our proprietary (Z)-endoxifen (an active metabolite of Tamoxifen);
- the success, costs and timing of our development activities, such as clinical trials, including whether our studies using our (Z)-endoxifen therapies will enroll a sufficient number of subjects in a timely fashion or be completed in a timely fashion or at all;
- whether we will successfully complete our clinical trial of oral (Z)-endoxifen in women with mammographic breast density and our trials of (Z)-endoxifen in women with breast cancer, and whether the studies will meet their objectives;
- our ability to contract with third-party suppliers, manufacturers and service providers, including clinical research organizations, and their ability to perform adequately;
- our ability to successfully develop and commercialize new therapeutics currently in development or that we might identify in the future and in the time frames currently expected;
- our ability to successfully defend litigation and other similar complaints that may be brought in the future, in a timely manner and within the coverage, scope and limits of our insurance policies;
- our ability to establish and maintain intellectual property rights covering our products;
- our increased risk of theft or misappropriation of our intellectual property and other proprietary technology outside of the U.S.;
- our expectations regarding, and our ability to satisfy, federal, state and foreign regulatory requirements;
- the accuracy of our estimates of the size and characteristics of the markets that our products may address;
- whether final study results will vary from preliminary study results that we may announce;
- our expectations as to future financial performance, expense levels and capital sources;
- our ability to attract and retain key personnel; and
- our ability to raise capital.

This Annual Report also contains estimates and other statistical data provided by third-parties and by us relating to market size and growth, and other industry data. These and other forward-looking statements, unless otherwise indicated, are presented as of the date of the filing of this Annual Report. We have included important factors in the cautionary statements included in this Annual Report, particularly in the section titled "ITEM 1A. RISK FACTORS," that we believe could cause our actual results, or events or outcomes to differ materially from the anticipated results, events or outcomes. Our forward-looking statements do not reflect the potential impact of any new information, future events or circumstances that may affect our business after the date of this Annual Report. Except as required by law, we expressly disclaim any intent to update any forward-looking statements, whether as a result of new information, future events, circumstances or otherwise.

CORPORATE INFORMATION

Our corporate website is located at *www.atossatherapeutics.com*. The information contained on or connected to our website is not deemed to be incorporated by reference into this Annual Report or filed with the Securities and Exchange Commission (the SEC) and should not be considered part of this Annual Report. We make available, free of charge through our website or upon written request, our Annual Reports on Form 10-K, Quarterly Reports on Form 10-Q, Current Reports on Form 8-K and other periodic SEC reports, along with amendments to all of those reports, as soon as reasonably practicable after we file the reports with the SEC.

Unless otherwise noted, the terms "Atossa Therapeutics," "Atossa," the "Company," "we," "us," and "our" refer to Atossa Therapeutics, Inc., a Delaware corporation.

We are regulated by the FDA under the Federal Food Drug and Cosmetics Act, as well as by other U.S. and foreign federal, state and local agencies.

This Annual Report includes trademarks, trade names and service marks of third-parties, which are the property of their respective owners. You are advised to read this Annual Report on Form 10-K in conjunction with other reports and documents that we file from time to time with the SEC.

PART I

ITEM 1. BUSINESS

Overview

We are a clinical-stage biopharmaceutical company developing proprietary innovative medicines in areas of significant unmet medical need in oncology, with a current focus on breast cancer and other breast conditions. Our lead drug candidate under development is oral (Z)-endoxifen which we are developing in two settings: one to treat breast cancer by reducing tumor cell activity prior to surgery and another to reduce breast tissue density in women. More than ten million women in the U. S and millions more worldwide have elevated breast density, which reduces the ability of mammograms to detect cancer and increases the risk of breast cancer. Currently, there is no FDA-approved treatment for breast density. We believe there is also a significant unmet need for breast cancer treatments in premenopausal women prior to surgery, as the typical treatment for the majority of early-stage breast cancer patients currently involves ovarian function suppression, which can induce premature menopause and dramatically impact a patient's quality of life.

We have been granted two U.S. patents covering our proprietary (Z)-endoxifen and we have numerous applications pending in the U.S. and in other countries.

Our business strategy is to advance our programs through clinical studies, including with partners, and opportunistically add programs in areas of high unmet medical need through acquisition, minority investment, collaboration or internal development.

Summary of Leading Programs

(Z)-endoxifen. (Z)-endoxifen is an active metabolite of tamoxifen, which is an FDA-approved drug to treat and prevent breast cancer in high-risk women. We are developing a proprietary form of (Z)-endoxifen which is administered orally for the potential treatment of breast cancer and reduction of breast density. We have completed four Phase 1 clinical studies (including a study in men) and two Phase 2 clinical studies with our proprietary (Z)-endoxifen (including oral and topical formulations). We have also completed significant pre-clinical development and have established clinical manufacturing capabilities through qualified third-parties.

(Z)-endoxifen for Women with Measurable Breast Density. Mammographic breast density (MBD) is an emerging public health issue affecting over ten million women in the U.S. alone. Studies conducted by others have shown that MBD increases the risk of developing breast cancer and that reducing MBD may reduce the incidence of breast cancer.

In December 2021, we commenced a Phase 2 study of our proprietary oral (Z)-endoxifen. The study, known as the Karisma-(Z)-endoxifen study, is a Phase 2, randomized, double-blind, placebo-controlled, dose-response study of our proprietary oral (Z)-endoxifen in healthy premenopausal women with measurable breast density. The primary objective of the study is to determine the dose-response relationship of daily (Z)-endoxifen on breast density reduction. Secondary endpoints will assess safety and tolerability. The study also includes an exploratory endpoint to assess durability of the breast density changes. The study is being conducted in Stockholm, Sweden and will include approximately 240 participants, at full enrollment, who will receive daily doses of oral (Z)-endoxifen or placebo for six months after they enroll. We expect to complete enrollment in this study by the end of 2023.

Based on input from the FDA and Swedish Medical Products Agency, reduction in MBD may not be an approvable indication unless we can demonstrate that our (Z)-endoxifen also reduces the incidence of breast cancer. We may therefore conduct additional studies of (Z)-endoxifen to assess its correlation with the risk of breast cancer and/or reduction in the incidence of new breast cancers.

(Z)-endoxifen for Neoadjuvant Treatment of Breast Cancer. We are also developing (Z)-endoxifen to treat estrogen receptor positive (ER+) / human epidermal growth factor receptor 2 negative (HER2-) breast cancer in the neoadjuvant setting, which is the administration of a therapy before the main treatment, which is usually surgery. Although there are neoadjuvant treatments for breast cancers that are not ER+, there are few neoadjuvant treatments for ER+ breast cancer, which comprises about 78% of all breast cancers and the treatments that are available typically involve ovarian function suppression which can induce premature menopause and significantly impact quality of life. We believe there is a compelling need for therapy with our (Z)-endoxifen in this setting.

In October 2022, we received authorization from the U.S. FDA for our Investigational New Drug (IND) application for oral (Z)-endoxifen. The study, "A Randomized Phase 2 Noninferiority Trial of (Z)-endoxifen and Exemestane + Goserelin as Neoadjuvant Treatment in Premenopausal Women with ER+/HER2- Breast Cancer," also known as "EVANGELINE," is an open-label, randomized, Phase 2 study designed to investigate (Z)-endoxifen for the neoadjuvant treatment of premenopausal women ages 18 and older with early stage (Grade 1 or 2) ER+/HER2- breast cancer. In February 2023, we enrolled the first patient in this study.

In March 2023, we announced that (Z)-endoxifen will be evaluated in a new study arm of the ongoing I-SPY endocrine program. This portion of the study targets patients with newly ER+ invasive cancer. The I-SPY trial is a collaborative effort among academic investigators from 20 major cancer research centers across the U.S., Quantum Leap Healthcare Collaborative, the FDA, and the Foundation for the National Institutes of Health (FNIH) Cancer Biomarkers Consortium. Atossa will supply (Z)-endoxifen and provide financial support to Quantum Leap for this study.

Inhaled HNAC, or "AT-H201." AT-H201 was under development as a potential treatment for COVID-19; however, due to the rapidly shifting treatment landscape and introduction of effective vaccines and treatments, in late 2022 we shifted to the treatment of patients with compromised lung function due to the damaging effects of cancer treatment. We are scheduled to conclude our study in healthy volunteers with AT-H201 in early 2023, but we do not expect to advance the program further in 2023, as we direct our focus on our (Z)-endoxifen programs.

Recent Investment in CAR-T Company

On December 23, 2022, we closed our previously announced investment in Dynamic Cell Therapies, Inc. (DCT), a privately-held, venture-capital backed, developer of CAR-T therapies. DCT is in the pre-clinical phase of developing controllable CAR-T cells to address difficult-to-treat cancers. Its platform technology of dynamic control of engineered T-cells is designed to improve the safety, efficacy and durability of CAR-T cell therapies. While its initial focus is hematologic malignancies, it's possible that its innovative approach could also have broad applicability in solid tumors and autoimmune diseases. Atossa's investment in DCT, which totaled $4.7 million, resulted in Atossa owning approximately 19% of the outstanding capital stock of DCT as of December 31, 2022.

Impact of the Ongoing Coronavirus Pandemic

The ongoing COVID-19 pandemic may affect our operations and those of third-parties on which we rely, including causing possible disruptions in the supply of (Z)-endoxifen, the pace of enrollment in our clinical trials and the conduct of current and future clinical trials. In addition, the COVID-19 pandemic may affect the operations of the U.S. FDA and other health authorities, including similar entities/agencies in Sweden and Australia, which could result in delays in meetings, reviews and approvals. As the COVID-19 pandemic reaches endemic stages, the extent to which it may continue to impact our operations, including COVID-19-related delays or other impacts on our business, financing or clinical trial activities or on healthcare systems or the global economy as a whole, remains highly uncertain and difficult to predict; however, as of March 16, 2023, we have not experienced a significant delay or disruption in the enrollment or the drug supply for our ongoing clinical studies.

Our Programs Under Development

(Z)-endoxifen Programs

Background

(Z)-endoxifen is the most active metabolite of the drug called tamoxifen, which has been FDA-approved and widely used for over 40 years to both treat and prevent breast cancer. Tamoxifen is a "pro-drug," in that it must be metabolized into active components ("metabolites") to be effective. Despite the success of tamoxifen in treating ER+ breast cancer, its systemic side effects have led to generally low acceptance as a therapy to reduce the risk of breast cancer. These systemic side effects relate to estrogen agonist activity on the endometrium and the activation of coagulation pathways, leading to an increased risk of uterine events and thromboembolism. Hot flashes and vaginal symptoms are additional barriers to tamoxifen being accepted in the prevention setting.

Other limiting aspects of tamoxifen are that some people lack liver enzymes to adequately metabolize it and it can take a long time for many patients to reach therapeutic levels. Up to 50% of breast cancer survivors who take tamoxifen do not achieve therapeutic (Z)-endoxifen levels (meaning they are "refractory") for a number of reasons, including that they, due to their genotype, do not have the requisite liver enzymes. We believe our proprietary oral (Z)-endoxifen, in part because it is not a pro-drug and does not need to be metabolized by the liver, may overcome some of the shortcomings of tamoxifen.

We estimate that approximately ten million women in the U.S. have MBD, for which there is no FDA-approved treatment. MBD is an emerging public health issue and studies conducted by others have shown that MBD increases the risk of breast cancer and that reducing MBD may reduce the incidence of breast cancer. Although oral tamoxifen is approved to prevent breast cancer in "high-risk" women (typically based on responses to a questionnaire), it is used by less than 5% of women with an increased risk of developing breast cancer because of the actual or perceived side effects and risks of tamoxifen. We believe our (Z)-endoxifen may provide an option for women to proactively reduce the density of their breasts. Moreover, our (Z)-endoxifen may improve mammography accuracy and patient care by unmasking cancerous tumors that are otherwise hidden by breast density.

U.S. federal and state legislation require that women be notified if they have MBD. These notifications typically state that women with MBD have a higher risk of developing breast cancer, and that mammography may not be as effective in detecting breast cancer because the MBD can "mask" cancers which can hinder detection.

Our Phase 1 Studies

In 2020, we completed a Phase 1, randomized double-blinded, placebo-controlled study in 12 healthy females in Australia to evaluate safety, tolerability and pharmacokinetics of 4 mg delayed release tablets. There were no adverse safety signals in this single dose study.

In 2019, we completed a double-blinded, parallel design Phase 1 study in 24 healthy females randomized to either active or placebo in Australia to evaluate pharmacokinetics of our 4 mg capsule (Z)-endoxifen and a new 4 mg modified-release tablet form of our (Z)-endoxifen, as well as to assess safety and tolerability. Study results showed that the capsule and tablet were safe and well-tolerated.

In 2018, we completed a placebo controlled, three arm, Phase 1, dose escalation study of our topical (Z)-endoxifen (2, 6 and 10 mg) for 28 days in 24 healthy males in Australia. Results showed that various dose levels of our topical (Z)-endoxifen were safe and well tolerated.

In 2017, we completed a Phase 1 study in 49 healthy women in Australia using both the topical and oral capsule forms of our proprietary (Z)-endoxifen to assess the pharmacokinetics of our proprietary (Z)-endoxifen dosage forms as single (oral) and repeat (oral capsule 1, 2 and 4 mg and topical 2, 6 and10 mg) doses, as well as to assess safety and tolerability. The study was conducted in two parts based on route of administration. There were no clinically significant safety signals and no clinically significant adverse events: both the oral and topical (Z)-endoxifen were well tolerated.

In the topical arm of the study, there were low but detectable (Z)-endoxifen levels in the blood in a dose-dependent fashion, and in the oral arm of the study, participants exhibited dose-dependent (Z)-endoxifen levels consistent with published reports of the therapeutic range. The median time for patients in the study to reach the steady-state serum levels of (Z)-endoxifen while taking daily doses of oral (Z)-endoxifen was approximately seven days. Published literature indicates that it takes approximately 50-200 days for patients to reach steady-state (Z)-endoxifen levels when taking daily doses of oral tamoxifen. Finally, the median time for patients in the study to reach the maximum serum level of (Z)-endoxifen after taking Atossa's oral (Z)-endoxifen ranged from four to eight hours (depending on dose). The 4 mg dose of (Z)-endoxifen produced a

maximum serum level of (Z)-endoxifen in four to eight hours at levels above the generally accepted threshold for a therapeutic effect on estrogen-dependent breast cancer.

Our Phase 2 Studies

In October 2022, we received authorization from the FDA to initiate our Phase 2 study of neoadjuvant (Z)-endoxifen in premenopausal women with ER+/HER2- breast cancer. This study is now open for enrollment. The study, "A Randomized Phase 2 Noninferiority Trial of (Z)-endoxifen and Exemestane + Goserelin as Neoadjuvant Treatment in Premenopausal Women with ER+/HER2- Breast Cancer," also known as "EVANGELINE," is an open-label, randomized, Phase 2 study designed to investigate (Z)-endoxifen for the neoadjuvant treatment of premenopausal women ages 18 and older with early stage (Grade 1 or 2) ER+/HER2- breast cancer. This study is a multicenter study in the U.S., is expected to enroll approximately 175 patients and is designed with two cohorts: (1) a pharmacokinetics (PK) Run-In Cohort to investigate pharmacokinetics and identify a dose for the Treatment Cohort, and (2) a Treatment Cohort. In February 2023, we enrolled our first patient in the study.

The primary objective of the study is to assess whether the endocrine sensitive disease rate at four weeks with (Z)-endoxifen is non-inferior to exemestane plus goserelin in premenopausal women with ER+/HER2- breast cancer. Endocrine sensitivity, or the effect of endocrine therapy on the tumor, will be measured by Ki-67%, a biomarker for tumor cell proliferation. Ki-67 is known to be prognostic for 5-year disease-free survival in the neoadjuvant endocrine treatment of ER+/HER2- breast cancer. The neoadjuvant setting of this study will allow Atossa to investigate several translational endpoints using paired tumor samples. Patients will be enrolled with the intent of surgical treatment in the involved breast(s) after completing neoadjuvant treatment. Patients will receive neoadjuvant treatment for up to six months. Surgery will be performed within seven days of the last dose of treatment.

In December 2021, we began to enroll participants in a Phase 2 clinical study of oral (Z)-endoxifen in women with elevated MBD. The study, known as the Karisma-Endoxifen study, is a Phase 2, randomized, double-blind, placebo-controlled, dose-response study of our proprietary (Z)-endoxifen in healthy pre-menopausal women with elevated breast density. The primary endpoint of the study is the change from baseline MBD at six months, with secondary endpoints to assess safety and tolerability, and an exploratory endpoint to assess durability of the MBD changes after the study drug has been discontinued. It is being conducted by South General Hospital in Stockholm and is expected to include approximately 240 participants, at full enrollment, who will receive daily doses of oral (Z)-endoxifen or placebo for six months after they enroll. The study is being conducted in Stockholm, Sweden.

In February 2021, we concluded a Phase 2 study of our oral (Z)-endoxifen in Australia. The study enrolled patients newly-diagnosed with ER+ and HER2- stage 1 or 2 invasive breast cancer, requiring mastectomy or lumpectomy. Patients received our proprietary oral (Z)-endoxifen for at least 14 days from the time of diagnosis up to the day of surgery. The primary endpoint was to determine if the administration of oral (Z)-endoxifen reduces tumor activity as measured by Ki-67. The secondary endpoints were safety and tolerability and assessment of the study drug on expression levels of both estrogen and progesterone receptors. In June 2021, we concluded that the study produced substantially positive results and that continuing enrollment in the study would not be useful in advancing the program. The final results from the seven women in the study indicated a 65% reduction in Ki-67. There were no adverse safety signals or laboratory findings.

In April 2019, we completed a randomized, double-blinded placebo-controlled Phase 2 study of our topical endoxifen in women with measurable MBD in Stockholm, Sweden. The primary endpoint of this pilot study was to determine if topical endoxifen reduces individual MBD as measured by mammography. Secondary endpoints included demonstrating safety and tolerability. The study enrolled 90 participants who were equally randomized to three different groups (30 participants per group): placebo; 10 mg topical endoxifen; and 20 mg topical endoxifen. Participants applied the study drug to each breast daily for a maximum of six months. Each participant received a baseline (pre-treatment) mammogram, and additional mammograms at months three and six, or at the time of study exit. Once the study was completed, all mammograms were interpreted and MBD determined, and any changes that occurred were recorded.

In June 2019, we reported preliminary analysis from our Phase 2 study of proprietary daily topical endoxifen to reduce MBD, showing significant ($p=0.02$) and rapid reduction in MBD at the 20 mg daily dose level. MBD was reduced by an average of 14.3% in the group applying 20 mg daily topical endoxifen, which was statistically significant ($p = 0.02$). In the 10 mg dose group, MBD was reduced by an average of 9.0%, but was not statistically significant. Approximately 70% of participants receiving 20 mg topical endoxifen experienced a reduction in MBD, and of those, the mean reduction in MBD was 27%. There were no differences in systemic endocrine or vascular side effects (for example, hot flashes) in the placebo versus active groups. Systemic side effects were measured using a modified validated symptom questionnaire. Approximately 72 participants eventually developed skin rashes and local irritation and did not complete a full six months of dosing. However, these results which are based on MBD measurements at the time of enrollment in the study and again at the time dosing ended, showed that even in those participants who dropped out of the study due to skin reactions, endoxifen reduced MBD in a mean of 55 and 88 days in the 20 mg and 10 mg groups, respectively. Our initial evaluation indicates that the skin reactions are due to the active pharmaceutical ingredient. We are not currently planning to further develop our topical endoxifen.

AT-H201 for Lung Injury Caused by Cancer Treatments

AT-H201 consists of a proprietary combination of two drugs previously approved by the FDA to treat other diseases. AT-H201 is intended to be inhaled via nebulizer with the goal of preventing or reducing lung injury from COVID-19. In July 2022, we completed dosing in a placebo-controlled Phase 1/2a study of AT-H201 in healthy participants in Australia. The study originally had four cohorts: Part A – a single ascending dose cohort; Part B – a multiple ascending dose cohort; Part C – a combination part in healthy individuals; and cohort D – a combination in COVID-19 infected patients. After we completed dosing in cohorts A, B and C of the study, we decided not to proceed with cohort D; rather, we shifted the development of AT-H201 due to the rapidly shifting treatment landscape and introduction of effective vaccines and treatments for COVID-19, which more closely aligns with our oncology focus by continuing development of AT-H201 in patients with compromised lung-function due to the damaging effects of cancer treatment, including, for example, lung injury caused by radiation treatment, which is poorly treated with current therapies and is often irreversible.

One type of injury caused by cancer treatment is radiation induced lung injury (or, RILI), which is damage to the lungs caused by ionizing radiation administered to treat cancer. RILI is a significant issue for patients undergoing radiation treatment for various forms of cancer and is often irreversible. For instance, RILI affects 30-40% of lung cancer patients, and approximately 35% of esophageal cancer patients. In non-small cell cancer patients receiving concurrent chemotherapy and radiation therapy, the incidence of RILI is estimated to be greater than 60%. We believe RILI affects a significant number of patients across multiple cancer types and that there is a meaningful need for new treatments.

We do not plan to advance our AT-H201 program in 2023 as we focus our resources on our (Z)-endoxifen programs.

Other Programs; Immunotherapy/CAR-T Programs

Recent Investment in CAR-T Company. On December 23, 2022, we closed our previously announced investment in DCT, a privately-held, venture-capital backed, developer of CAR-T therapies. DCT is in the pre-clinical phase of developing controllable CAR-T cells to address difficult-to-treat cancers. Its platform technology of dynamic control of engineered T-cells is designed to improve the safety, efficacy, and durability of CAR-T cell therapies. While its initial focus is hematologic malignancies, it's possible that its innovative approach could also have broad applicability in solid tumors and autoimmune diseases. Atossa's investment in DCT, which totaled $4.7 million, resulted in Atossa owning approximately 19% of the outstanding capital stock of DCT.

Much of the recent successes in the field of chimeric antigen receptor therapy, or CAR-T, has relied on the systemic delivery (for example, a needle injection into the blood stream) of the CAR-T which is intended to treat various non-solid tumor cancers, such as blood cancers. One concern with this systemic approach is that it does not target the location of the cancer and it can have adverse effects, including deadly "cytokine storms." Moreover, CAR-T treatments delivered systemically can be as high as $500,000 per patient.

Our immunotherapy/CAR-T programs are in early stage of development. On November 26, 2020, we entered into a sponsored research agreement with Dana-Farber Cancer Institute, Inc. The agreement provides that Atossa will support research of cytokine-coated nanoparticles for the potential treatment of breast cancer, which was conducted by Carl Novina, MD, Ph.D. This research project is now substantially complete.

We have filed patent applications on a novel method to deliver CAR-T cells or other types of immunotherapy into the milk ducts of the breast, the location where most breast cancers originate for the potential targeted treatment of breast cancer. This approach uses targeted intraductal delivery of either T-cells that have been genetically modified to attack breast cancer cells or various other immune-therapies. We believe this intraductal method has several potential advantages, including the reduction of toxicity by limiting systemic exposure of the T-cells or immunotherapy; improved efficacy by placing the T-cells or immunotherapy in direct contact with the target ductal epithelial cells that are undergoing or have undergone malignant transformation; and, lymphatic migration of the CAR-T cells or immunotherapy potentially extending their cytotoxic actions into the regional lymph system, which could limit tumor cell dissemination or metastasis. Moreover, our approach may be more cost effective if lower doses of therapy can be delivered compared to systemic CAR-T. We have not begun, and may not be successful in completing, pre-clinical and clinical studies of our CAR-T technology.

Markets

Potential Breast Cancer Market Opportunities

We believe that, based in part on a study by Defined Health Inc. (now Lumanity), a leading market research firm, the potential U.S. market for our (Z)-endoxifen in the breast cancer treatment and prevention settings is up to $1 billion annually. The American Cancer Society (ACS) estimates that in the U.S. in 2023, 297,790 women will be diagnosed with breast cancer and about 43,700 women will die from breast cancer. Approximately 80% of breast cancers are ER+.

Breast cancer also affects men, though the incidence is around 100 times lower than in women. The ACS estimates that in the U.S. in 2023, 2,800 new cases of invasive breast cancer will be diagnosed in men, and 530 men will die from breast cancer.

Our Capital Resources

We have not yet established an ongoing source of revenue sufficient to cover our operating costs and allow us to continue as a going concern. Our ability to continue as a going concern is dependent on obtaining adequate capital to fund operating losses until we become profitable. We plan to obtain additional capital resources by selling our equity securities and borrowing from stockholders or others when needed. However, we cannot assure you that we will be successful in accomplishing any of these plans and, if we are unable to obtain adequate capital, we could be forced to cease operations. We do not anticipate any revenue until our pharmaceutical programs are developed, including receipt of all necessary regulatory approvals, and we successfully commercialize these programs.

As of December 31, 2022, we had cash and cash equivalents of approximately $111 million. We did not raise any capital in the past fiscal year.

Potential Uses of Capital Resources

We intend to use our capital resources to execute on our business plan, which may include acquiring or in-licensing additional programs. We may also use our capital resources to invest directly or indirectly in business opportunities in healthcare or other industries including through purchases of equity in other companies. These investments may include investing in special purpose acquisition companies either as a sponsor or as an equity investor. Our business plan may evolve to require more capital resources than currently contemplated either because our existing programs progress more quickly or at a greater cost than currently anticipated or because we may add additional programs.

Research and Development Phase

We are in the research and development phase and are not currently marketing any products or services. We do not anticipate generating revenue unless and until we develop and launch our pharmaceutical programs.

Research and development (R&D) costs are generally expensed as incurred. R&D expenses include, for example, manufacturing expense for our drugs under development, expenses associated with clinical trials and associated salaries and benefits. We have entered into various research and development contracts with research institutions, clinical research organizations, clinical manufacturing organizations and other companies. Payments for these activities are based on the terms of the individual agreements, which may differ from the pattern of costs incurred, and payments made in advance of performance are reflected in the accompanying consolidated balance sheets as prepaid expenses. We accrue for estimated costs incurred for ongoing research and development activities. When evaluating the adequacy of the accrued expenses, we analyze the progress of the services, including the phase or completion of events, invoices received and contracted costs. Significant judgments and estimates may be made in determining the prepaid expense or accrued expense balances at the end of any reporting period. Actual results could differ from our estimates.

R&D expenses also include an allocation of the CEO's salary and related benefits, including bonus and non-cash stock-based compensation expense based on an estimate of total hours expended on research and development activities. Our CEO is involved in the development of the Company's drug candidates and oversight of the related clinical trial activity.

Research and development expenses for the years ended December 31, 2022 and 2021 were approximately $15.1 million and $9.2 million, respectively.

Intellectual Property

We own patents directed to (Z)-endoxifen and patent applications directed to (Z)-endoxifen, therapies for respiratory conditions, other therapies, and immunotherapies such as CAR-T therapies. We commonly seek patent claims directed to compositions of matter of therapeutics, including (Z)-endoxifen, as well as methods of using such compositions. For each of our products, we have filed multiple patent applications and expect to file multiple additional patent applications. As of January 31, 2023, based on a review of our patent estate, we own two issued patents (one U.S. patent and one international patent) directed to our (Z)-endoxifen therapies, therapies for respiratory conditions, other therapies, immunotherapies such as CAR-T therapies, and viral detection programs and are pursuing 75 pending patent applications (19 U.S. applications, including one allowed U.S. application, and 56 international applications, including two allowed international applications). Subsequent to January 31, 2023, we were issued an additional U.S. patent directed to our (Z)-endoxifen therapies. We continue to evaluate our patent portfolio on an ongoing basis and, as a clinical-stage pharmaceutical company, no longer file, prosecute, maintain, or defend our patents and patent applications directed to any devices or diagnostics, and compositions not core to our business or to methods of using the foregoing due to short patent terms remaining on them and changed business goals.

As of January 31, 2023, the following are the estimated number of patents related to our programs that we are currently pursuing.

	Issued Patents (1,2,3)		Pending Applications (1, 2, 3)		Approximate Expiry Date (3)
	U.S.	International	U.S.	International	
(Z)-endoxifen programs	1	1	8	27	2038 - 2044
Respiratory and viral programs	-	-	3	8	2041 - 2043
Immunotherapy/CAR-T program	-	-	5	21	2037 - 2044
Other therapies programs	-	-	3	-	2043 - 2044

1. Each patent application includes at least one claim or disclosure directed to a listed therapeutic/program.

2. The patent counts in the table above may differ from the total numbers of the patent applications in the Atossa portfolio as the patent counts in the table above reflect that a patent application may have claims directed to more than one type of therapeutic/program.

3. The patent counts and the approximate expiration dates disclosed herein and in our patent estate are subject to change, for example, in the event of changes in the law, post-grant patent challenges, or legal rulings affecting our patents and applications or if we become aware of new information or amend our business goals. The standards that the U.S. Patent and Trademark Office, or USPTO, and foreign patent offices use to grant patents are not always applied predictably or uniformly and can change. Consequently, our pending patent applications may not be allowed and, if allowed, may not contain the type and extent of patent claims that would be adequate to conduct our business as planned. Additionally, any issued patents we currently own or may obtain in the future may have a shorter patent term than expected or may not contain claims that will permit us to stop competitors from using our technology or similar technology or from copying our products.

Manufacturing, Clinical Studies and Associated Operations

Our drug development strategy utilizes third-party contractors for the procurement and manufacture, as applicable, of raw materials, active pharmaceutical ingredients and finished drug products, as well as for storage, and distribution of our products and associated supply chain operations. We also rely on third-parties to conduct nonclinical and clinical studies of our drugs under development. As our development programs advance, we expect that our manufacturing, pre-clinical and clinical studies, and related operational requirements will correspondingly increase. We require that each third-party contractor is qualified by Atossa subject matter experts prior to signing any service agreement and initiating any third-party work.

Integral to our development strategy is our quality program, which includes standard operating procedures and specifications with the goal that our work complies with Good Clinical Practices (GCP), Good Laboratory Practices (GLP) and Current Good Manufacturing Practices (cGMP), and other applicable global regulations, when appropriate. We expect and confirm that selected service providers meet or exceed our expectations for compliance with these standards in providing services and products that meet our requirements.

We believe our operational strategy of utilizing qualified contractors and suppliers in the foregoing manner allows us to direct our financial and managerial resources to development and commercialization activities, rather than to the establishment and maintenance of manufacturing and clinical infrastructure.

Government Regulation

Drug Regulations

We are subject to extensive regulation by the FDA and other federal, state, and local regulatory agencies. The Federal Food, Drug, and Cosmetic Act, or the FDCA, and its implementing regulations set forth, among other things, regulations for the execution of clinical studies, and the requirements for the testing, development, manufacture, quality control, safety, effectiveness, approval, labeling, storage, record keeping, reporting, distribution, import, export, advertising and promotion of our products. Our activities in other countries will be subject to regulation that is similar in nature and scope as that imposed in the U.S., although there can be important differences. Additionally, some significant aspects of regulation in the E.U. are addressed in a centralized procedure through the Europe Medicines Agency (EMA) and the European Commission, but country-specific regulation by the competent authorities of the E.U. member states remain essential in many respects. Also see the “Non-U.S. Regulation” section below in connection with the position in the United Kingdom (UK).

U.S. Regulations

In the U.S., the FDA regulates drugs under the FDCA and its implementing regulations, through review and ultimately approval of the New Drug Applications (NDAs). NDAs require extensive studies and submission of a large amount of data by the applicant, which is an

amalgamation of data obtained under Investigational New Drug Applications (INDs) and other supporting available information. For a discussion of U.S. privacy laws, see “Privacy and Security of Health Information and Personal Information; Standard Transactions” below.

Drug Development

Nonclinical Testing: Before testing any compound in human subjects in the U.S., extensive nonclinical data are required. Nonclinical testing generally consists of safety, toxicology and pharmacology studies in animals. Many of these studies must be performed in compliance with the FDA's GLP regulations and the U.S. Department of Agriculture's Animal Welfare Act.

IND Application: In nearly all cases, human clinical trials in the U.S. cannot commence until an IND is submitted to the FDA for review and a "Safe to Proceed" letter has been provided to the sponsor. The sponsor must prepare a dossier of information that includes the results of nonclinical studies; detailed drug manufacturing information and test results; and proposed clinical studies, design and development strategy. The FDA then evaluates if there is an adequate basis for testing the drug in an initial (human) clinical study. Unless the FDA raises concerns, the IND application becomes effective 30 days following its receipt by the FDA at which time written notification is provided. Once human clinical trials have commenced, the sponsor is obligated to report serious side and unexpected effects to the FDA. The FDA may suspend a clinical trial by placing it on "clinical hold" if the FDA has concerns about the safety of the product being tested, subject risks, investigator actions, related product information or for other reasons.

Clinical Trials: Clinical trials involve the administration of the drug to healthy human volunteers or to patients, under the supervision of a qualified investigator according to a vetted and approved protocol.

The conduct of clinical trials is subject to extensive regulation, including compliance with the FDA's bioresearch monitoring regulations and GCP requirements, which establish standards for conducting, recording data from and reporting the results of, clinical trials, and are intended to assure that the data and reported results are credible and accurate, and that the rights, safety, and well-being of study participants are protected. Clinical trials must be conducted under written and approved protocols that detail the study objectives, parameters for monitoring safety, and the efficacy criteria, if any, to be evaluated. Each protocol is reviewed by the FDA as part of the IND application. In addition, each clinical trial must be reviewed, approved, and conducted under the auspices of an institutional review board, or IRB. Companies sponsoring the clinical trials, investigators, and IRBs also must comply with regulations and guidelines for obtaining informed consent from the study subjects, complying with the protocol and investigational plan, adequately monitoring the clinical trial and timely reporting adverse events. Foreign studies conducted under an IND application must meet the same requirements that apply to studies being conducted in the U.S. Data from a foreign study not conducted under an IND application may be submitted in support of an NDA if the study was conducted in accordance with GCP and the FDA is able to validate the data.

A study sponsor is required to submit certain details about applicable active clinical trials and clinical trial results to the National Institutes of Health for public posting on *http://clinicaltrials.gov.* Human clinical trials are typically conducted in three sequential phases, although the phases may overlap with one another:

- Phase 1clinical trials include the initial administration of the investigational drug to humans, typically to a small group of healthy human subjects, but occasionally to a group of patients with the targeted disease or disorder. Phase 1 clinical trials generally are intended to determine the metabolism and pharmacologic actions of the drug, the side effects associated with increasing doses, and, if possible, to gain early evidence of effectiveness.

- Phase 2 clinical trials generally are controlled studies that involve a relatively small sample of the intended patient population and are designed to develop data regarding the product's effectiveness, to determine dose response and the optimal dose range and to gather additional information relating to safety and potential adverse effects.

- Phase 3 clinical trials are conducted after preliminary evidence of effectiveness has been obtained and are intended to gather the additional information about safety and effectiveness necessary to evaluate the drug's overall risk-benefit profile, and to provide a basis for physician labeling. Generally, Phase 3 clinical development programs consist of expanded, large-scale studies of patients with the target disease or disorder to obtain statistical evidence of the efficacy and safety of the drug, or the safety, purity, and potency of a biological product, at the proposed dosing regimen.

The sponsoring company, the FDA or the IRB may suspend or terminate a clinical trial at any time on various grounds, including a finding that the subjects are being exposed to an unacceptable health risk. Further, success in early-stage clinical trials does not assure success in later-stage clinical trials. Data obtained from clinical activities are not always conclusive and may be subject to alternative interpretations that could delay, limit, or prevent regulatory approval.

There are regulatory pathways that can accelerate the speed with which a product can be developed, including a Special Protocol Assessment (SPA), break-through therapy designation, among others. The designations are obtained from the FDA on a case-by-case basis and do not guarantee the ultimate approval of a product for commercialization.

Drug Approval

Assuming successful completion of the required clinical testing, the results of the preclinical studies and of the clinical trials, together with other detailed information, including information on the manufacture and composition of the investigational product, are submitted to the FDA in the form of an NDA requesting approval to market the product for one or more indications. The testing and approval process requires substantial time, effort and financial resources. Submission of an NDA requires payment of a review user fee to the FDA, which will be $3,242,026 for fiscal year 2023. The FDA will review the application and may deem it to be inadequate to support commercial marketing, and there can be no assurance that any product approval will be granted on a timely basis, if at all. The FDA may also seek the advice of an advisory committee, typically a panel of clinicians practicing in the field for which the product is intended, for review, evaluation and a recommendation as to whether the application should be approved. The FDA is not bound by the recommendations of the advisory committee.

The FDA has various programs, including break-through therapy, fast track, priority review and accelerated approval that are intended to expedite or simplify the process for reviewing drugs and/or provide for approval on the basis of surrogate endpoints. Generally, drugs that may be eligible for one or more of these programs are those for serious or life-threatening conditions, those with the potential to address unmet medical needs and those that provide meaningful benefit over existing treatments. We cannot be sure that any of our drugs will qualify for any of these programs, or that, if a drug does qualify, the review time will be reduced, or the product will be approved.

Before approving an NDA, the FDA usually inspects the clinical sites with the greatest accrual to confirm the veracity of the clinical data, execution of the clinical study and protection of patient safety. The FDA will inspect the facility or the facilities where the product is manufactured, tested and distributed. Approval is not granted if these inspections raise concerns about the execution of the clinical studies or there is a lack of cGMP compliance. If the FDA evaluates the NDA and determines the clinical trial execution and manufacturing facilities as acceptable, the FDA may issue an approval letter. If the NDA is not approved, the FDA issues a complete response letter which is only issued for applications that are not approved. The approval letter authorizes commercial marketing of the drug for specific indications. As a condition of approval, the FDA may require post-marketing testing and surveillance to monitor the product's safety or efficacy or impose other post-approval commitment conditions.

In some circumstances, post-marketing testing may include post-approval clinical trials, sometimes referred to as Phase 4 clinical trials, which are used primarily to gain additional experience from the treatment of patients in the intended population, particularly for long-term safety follow-up. In addition, the FDA may require a Risk Evaluation and Mitigation Strategy, or REMS, to ensure that the benefits outweigh the risks. A REMS can include medication guides, physician communication plans and elements to assure safe use, such as restricted distribution methods, patient registries or other risk mitigation tools.

After approval, certain changes to the approved product, such as adding new indications, making certain manufacturing changes or making certain additional labeling claims, are subject to further FDA review and approval. Obtaining approval for a new indication generally requires that additional clinical trials be conducted.

Post-Approval Requirements

Holders of an approved NDA are required to: (i) report certain adverse reactions to the FDA; (ii) comply with certain requirements concerning advertising and promotional labeling for their products; and (iii) continue to have cGMP compliance and all aspects of product manufacturing in a "state of control." The FDA periodically inspects the sponsor's records related to safety reporting and/or manufacturing and distribution facilities; this latter effort includes assessment of compliance with cGMP. Accordingly, manufacturers must continue to expend time, money and effort in the area of production, quality control and distribution to maintain cGMP compliance. Future FDA inspections may identify compliance issues at manufacturing facilities that may disrupt production or distribution or require substantial resources to correct. In addition, discovery of problems with a product after approval may result in restrictions on a product, manufacturer or holder of an approved NDA, including withdrawal of the product from the market.

Marketing of prescription drugs is also subject to significant regulation through federal and state agencies tasked with consumer protection and prevention of medical fraud, waste and abuse. After approval in the U.S., we must comply with FDA's regulation of drug promotion and advertising, including restrictions on off-label promotion, and we comply with federal anti-kickback statutes, limitations on gifts and payments to physicians and reporting of payments to certain third-parties, among other requirements.

Failure to comply with applicable U.S. requirements may subject us to administrative or judicial sanctions, such as clinical holds, FDA refusal to approve pending NDAs or supplemental applications, warning letters, product recalls, product seizures, total or partial suspension of production or distribution, injunctions and/or criminal prosecution.

Non-U.S. Regulation

Before our products can be marketed outside of the U.S., they are subject to regulatory approval similar to that required in the U.S., although the requirements governing the conduct of clinical trials, including additional clinical trials that may be required, product licensing, pricing and reimbursement vary widely from country to country. No action can be taken to market any product in a country until an appropriate application has been approved by the regulatory authorities in that country. The current approval process varies from country to country, and the time spent in gaining approval varies from that required for FDA approval. In certain countries, the sales price of a product must also be approved. The pricing review period often begins after market approval is granted. Even if a product is approved by a regulatory authority, satisfactory prices may not be approved for such product.

Drug Marketing Authorization. In the E.U., which includes Sweden where our (Z)-endoxifen breast density study is being conducted, and in Iceland, Norway and Liechtenstein (together, the European Economic Area or EEA), after completion of all required clinical testing, medicinal products may only be placed on the market after obtaining a Marketing Authorization (MA). To obtain a MA of a drug under European Union regulatory systems, an applicant can submit a Marketing Authorization Application (MAA), through, amongst others, a centralized or decentralized procedure.

Centralized Authorization Procedure. In the E.U., marketing authorizations for medicinal products can be obtained through several different procedures founded on the same basic regulatory process. The centralized procedure provides for the grant of a single MA that is issued by the European Commission (the EC) following the scientific assessment of the application by the European Medicines Agency (the EMA) that is valid for all E.U. Member States as well as in the three additional EEA Member States. The centralized procedure is mandatory for certain medicinal products, including for medicines developed by means of certain biotechnological processes, products designated as orphan medicinal products, advanced therapy medicinal products (ATMP), and medicinal products with a new active substance indicated for the treatment of certain diseases (e.g., AIDS, cancer, neurodegenerative disorders, diabetes, auto-immune and viral diseases). For medicinal products containing a new active substance not yet authorized in the EEA before May 20, 2004 and indicated for the treatment of other diseases, medicinal products that constitute significant therapeutic, scientific or technical innovations, or for which the grant of a MA through the centralized procedure would be in the interest of public or animal health at the E.U. level, an applicant may voluntarily submit an application for a marketing authorization through the centralized procedure.

Under the centralized procedure, the Committee for Medicinal Products for Human Use (the CHMP), established at the EMA, is responsible for conducting the initial assessment of a drug. The CHMP is also responsible for several post-authorization and maintenance activities, such as the assessment of modifications or extensions to an existing marketing authorization. Under the centralized procedure, the timeframe for the evaluation of an MAA by the EMA's CHMP is, in principle, 210 days from receipt of a valid MAA. However, this timeline excludes clock stops, when additional written or oral information is to be provided by the applicant in response to questions asked by the CHMP, so the overall process typically takes a year or more, unless the application is eligible for an accelerated assessment. Accelerated evaluation might be granted by the CHMP in exceptional cases, when a medicinal product is expected to be of a major public health interest, particularly from the point of view of therapeutic innovation. Upon request, the CHMP can reduce the time frame to 150 days if the applicant provides sufficient justification for an accelerated assessment. The CHMP will provide a positive opinion regarding the application only if it meets certain quality, safety and efficacy requirements. This opinion is then transmitted to the EC, which has the ultimate authority for granting MA within 67 days after receipt of the CHMP opinion.

Decentralized Authorization Procedure. Medicines that fall outside the mandatory scope of the centralized procedure have three routes to authorization: (i) they can be authorized under the centralized procedure if they concern a significant therapeutic, scientific or technical innovation, or if their authorization would be in the interest of public health; (ii) they can be authorized under a decentralized procedure where an applicant applies for simultaneous authorization in more than one E.U. member state; or (iii) they can be authorized in an E.U. member state in accordance with that state's national procedures and then be authorized in other E.U. countries by a procedure whereby the countries concerned agree to recognize the validity of the original, national marketing authorization (mutual recognition procedure).

The decentralized procedure permits companies to file identical MA applications for a medicinal product to the competent authorities in various E.U. Member States simultaneously if such medicinal product has not received marketing approval in any E.U. Member State before. This procedure is available for medicinal products not falling within the mandatory scope of the centralized procedure. The competent authority of a single E.U. Member State, known as the reference E.U. Member State, is appointed to review the application and provide an assessment report. Under this procedure, an applicant submits an application based on identical dossiers and related materials, including a draft summary of product characteristics, and draft labeling and package leaflet, to the reference E.U. Member State and concerned E.U. Member States. The reference E.U. Member State prepares a draft assessment report and drafts of the related materials within 120 days after receipt of a valid application. Subsequently each concerned E.U. Member State must decide whether to approve the assessment report and related materials. If an E.U. Member State cannot approve the assessment report and related materials on the grounds of potential serious risk to public health, the disputed points are subject to a dispute resolution mechanism and may eventually be referred to the EC, whose decision is binding for all E.U. Member States.

Risk Management Plan. All new MAAs must include a Risk Management Plan (RMP), describing the risk management system that the company will put in place and documenting measures to prevent or minimize the risks associated with the product. RMPs are continually modified and updated throughout the lifetime of the medicine as new information becomes available. We need to submit an updated RMP: (i) at the request of EMA or a national competent authority, or (ii) whenever the risk-management system is modified, especially as the result of new information being received that may lead to a significant change to the benefit-risk profile or as a result of an important pharmacovigilance or risk-minimization milestone being reached. The regulatory authorities may also impose specific obligations as a condition of the MA. RMPs and Periodic Safety Update Reports (PSURs) are routinely available to third parties requesting access, subject to limited redactions.

MA Validity Period. Marketing Authorizations have an initial duration of five years. After these five years, the authorization may subsequently be renewed on the basis of a reevaluation of the risk-benefit balance. Once renewed, the MA is valid for an unlimited period unless the EC or the national competent authority decides, on justified grounds relating to pharmacovigilance, to proceed with only one additional five-year renewal. Applications for renewal must be made to the EMA at least nine months before the five-year period expires.

Exceptional Circumstances/Conditional Approval. Similar to accelerated approval regulations in the U.S., conditional marketing authorizations can be granted in the E.U. by the European Commission in exceptional circumstances. A conditional marketing authorization can be granted for medicinal products where, although comprehensive clinical data referring to the safety and efficacy of the medicinal product have not been supplied, a number of criteria are fulfilled, including: (i) the benefit/risk balance of the product is positive, (ii) it is likely that the applicant will be in a position to provide the comprehensive clinical data, (iii) unmet medical needs will be fulfilled by the grant of the MA and (iv) the benefit to public health of the immediate availability on the market of the medicinal product concerned outweighs the risk inherent in the fact that additional data are still required. A conditional marketing authorization must be renewed annually.

*Pricing and Reimbursement Environment. E*ven if a medicinal product obtains a marketing authorization in the E.U., there can be no assurance that reimbursement for such product will be secured on a timely basis or at all. Individual countries comprising the E.U. member states, rather than the E.U., have jurisdiction across the region over patient reimbursement or pricing matters. Therefore, we will need to expend significant effort and expense to establish and maintain reimbursement arrangements in the various countries comprising the E.U. and may never succeed in obtaining widespread reimbursement arrangements therein.

The national authorities of the individual E.U. Member States are free to restrict the range of medicinal products for which their national health insurance systems provide reimbursement and to control the prices and/or reimbursement of medicinal products for human use. Some E.U. Member States adopt policies according to which a specific price or level of reimbursement is approved for the medicinal product. Other E.U. Member States adopt a system of direct or indirect controls on the profitability of the company placing the medicinal product on the market, including volume-based arrangements, caps and reference pricing mechanisms.

Reference pricing used by various E.U. Member States and parallel distribution, or arbitrage between low-priced and high-priced member states, can further reduce prices. In some countries, we may be required to conduct a clinical study or other studies that compare the cost-effectiveness of our product candidates, if any, to other available therapies in order to obtain or maintain reimbursement or pricing approval. There can be no assurance that any country that has price controls or reimbursement limitations for medicinal products will allow favorable reimbursement and pricing arrangements for any of our products. Historically, medicinal products launched in the E.U. do not follow price structures of the U.S. and generally published and actual prices tend to be significantly lower. Publication of discounts by third party payers or authorities and public tenders may lead to further pressure on the prices or reimbursement levels within the country of publication and other countries.

Health Technology Assessment (HTA) of medicinal products is becoming an increasingly common part of the pricing and reimbursement procedures in some E.U. Member States, including France, Germany, Ireland, Italy and Sweden. The HTA process, which is governed by the national laws of these countries, is the procedure according to which the assessment of the public health impact, therapeutic impact and the economic and societal impact of use of a given medicinal product in the national healthcare systems of the individual country is conducted. The extent to which pricing and reimbursement decisions are influenced by the HTA of the specific medicinal product vary between E.U. Member States. The HTA generally focuses on the clinical efficacy and effectiveness, safety, cost and cost-effectiveness of individual medicinal products as well as their potential implications for the healthcare system. Those elements of medicinal products are compared with other treatment options available on the market. The outcome of HTA regarding specific medicinal products will often influence the pricing and reimbursement status granted to medicinal products by the regulatory authorities of individual E.U. Member States. A negative HTA of one of our products by a leading and recognized HTA body could not only undermine our ability to obtain reimbursement for such product in the E.U. Member State in which such negative assessment was issued, but also in other E.U. Member States. For example, E.U. Member States that have not yet developed HTA mechanisms could rely to some extent on the HTA performed in other countries with a developed HTA framework, when adopting decisions concerning the pricing and reimbursement of a specific medicinal product.

On January 31, 2018, the European Commission adopted a proposal for a regulation on health technology assessment. This legislative proposal is intended to boost E.U. level cooperation among E.U. Member States in assessing health technologies, including new medicinal products, and providing the basis for cooperation at the E.U. level for joint clinical assessments in these areas. The proposal provides that E.U. Member States will be able to use common HTA tools, methodologies and procedures across the European Union, working together in four main areas, including joint clinical assessment of the innovative health technologies with the most potential impact for patients, joint scientific consultations whereby developers can seek advice from HTA authorities, identification of emerging health technologies to identify promising technologies early, and continuing voluntary cooperation in other areas. Individual E.U. Member States will continue to be responsible for assessing non-clinical (e.g., economic, social, ethical) aspects of health technology, and making decisions on pricing and reimbursement. While E.U. Member States could choose to delay participation in the joint work until three years after the rules enter into force, it will become mandatory after six years. The European Commission has stated that the role of the HTA regulation is not to influence pricing and reimbursement decisions in the individual E.U. Member States, but there can be no assurance that the HTA regulation will not have effects on pricing and reimbursement decisions. The HTA entered into force on January 11, 2022 and applies as of January 2025 followed by a further three-year transitional period during which E.U. member states must fully adapt to the new system.

To obtain, reimbursement or pricing approval in some countries, including the E.U. Member States, we may be required to conduct studies that compare the cost-effectiveness of our product candidates to other therapies that are considered the local standard of care. There can be no assurance that any country will allow favorable pricing, reimbursement and market access conditions for any of our products, or that we will be feasible to conduct additional cost-effectiveness studies, if required.

In certain of the E.U. Member States, medicinal products that are designated as orphan medicinal products may be exempted or waived from having to provide certain clinical, cost-effectiveness and other economic data in connection with their filings for pricing/reimbursement approval.

Post-Approval Regulation

Similarly, to the U.S., both marketing authorization holders and manufacturers of medicinal products are subject to comprehensive regulatory oversight by the EMA, the EC and/or the competent regulatory authorities of the individual E.U. Member States. This oversight applies both before and after grant of the manufacturing licenses and marketing authorizations. It includes control of compliance with E.U. good manufacturing practices rules, manufacturing authorizations, pharmacovigilance rules and requirements governing advertising, promotion, sale, and distribution, recordkeeping, importing and exporting of medicinal products.

Failure by us or by any of our third-party partners, including suppliers, manufacturers and distributors to comply with E.U. laws and the related national laws of individual E.U. Member States governing the conduct of clinical trials, manufacturing approval, marketing authorization of medicinal products and marketing of such products, both before and after grant of marketing authorization, statutory health insurance, bribery and anti-corruption or other applicable regulatory requirements may result in administrative, civil or criminal penalties. These penalties could include delays or refusal to authorize the conduct of clinical trials or to grant marketing authorization, product withdrawals and recalls, product seizures, suspension, withdrawal or variation of the marketing authorization, total or partial suspension of production, distribution, manufacturing or clinical trials, operating restrictions, injunctions, suspension of licenses, fines and criminal penalties.

The holder of an E.U. marketing authorization for a medicinal product must also comply with E.U. pharmacovigilance legislation and its related regulations and guidelines, which entail many requirements for conducting pharmacovigilance, or the assessment and monitoring of the safety of medicinal products.

These pharmacovigilance rules can impose on central marketing authorization holders for medicinal products the obligation to conduct a labor-intensive collection of data regarding the risks and benefits of marketed products and to engage in ongoing assessments of those risks and benefits, including the possible requirement to conduct additional clinical studies or post-authorization safety studies to obtain further information on a medicine’s safety, or to measure the effectiveness of risk-management measures, which may be time consuming and expensive and could impact our profitability. MA holders must establish and maintain a pharmacovigilance system and appoint an individual qualified person for pharmacovigilance, who is responsible for oversight of that system. Key obligations include expedited reporting of suspected serious adverse reactions and submission of Periodic Safety Update Reports (PSURs) in relation to medicinal products for which they hold MAs. The EMA reviews PSURs for medicinal products authorized through the centralized procedure. If the EMA has concerns that the risk benefit profile of a product has varied, it can adopt an opinion advising that the existing MA for the product be suspended, withdrawn or varied. The agency can advise that the MA holder be obliged to conduct post-authorization Phase IV safety studies. If the EC agrees with the opinion, it can adopt a decision varying the existing MA. Failure by the MA holder to fulfill the obligations for which the EC’s decision provides can undermine the ongoing validity of the MA.

More generally, non-compliance with pharmacovigilance obligations can lead to the variation, suspension or withdrawal of the marketing authorization for the product or imposition of financial penalties or other enforcement.

The manufacturing process for medicinal products in the E.U., is highly regulated: regulators may shut down manufacturing facilities that they believe do not comply with regulations. Manufacturing requires a manufacturing authorization, and the manufacturing authorization holder must comply with various requirements set out in the applicable E.U. laws, regulations and guidance, including Directive 2001/83/EC, Directive 2003/94/EC, Regulation (EC) No 726/2004 and the European Commission Guidelines for Good Manufacturing Practice (GMP). These requirements include compliance with E.U. GMP standards when manufacturing medicinal products and active pharmaceutical ingredients, including the manufacture of active pharmaceutical ingredients outside of the E.U. with the intention to import the active pharmaceutical ingredients into the E.U. Similarly, the distribution of medicinal products into and within the E.U. is subject to compliance with the applicable E.U. laws, regulations and guidelines, including the requirement to hold appropriate authorizations for distribution granted by the competent authorities of the E.U. Member States. The manufacturer or importer must have a qualified person who is responsible for certifying that each batch of product has been manufactured in accordance with GMP, before releasing the product for commercial distribution in the E.U. or for use in a clinical trial. Manufacturing facilities are subject to periodic inspections by the competent authorities for compliance with GMP.

Sales and Marketing Regulations

In the E.U., the advertising and promotion of our products are subject to E.U. and E.U. Member States' laws governing promotion of medicinal products, interactions with physicians, misleading and comparative advertising and unfair commercial practices. In addition, other legislation adopted by individual E.U. Member States may apply to the advertising and promotion of medicinal products and may differ from one country to another. These laws require that promotional materials and advertising in relation to medicinal products comply with the product's Summary of Product Characteristics (SmPC) as approved by the competent authorities. The SmPC is the document that provides information to physicians concerning the safe and effective use of the medicinal product. It forms an intrinsic and integral part of the marketing authorization granted for the medicinal product. Promotion of a medicinal product that does not comply with the SmPC is considered to constitute off-label promotion. All advertising and promotional activities for the product must be consistent with the approved SmPC and therefore all off-label promotion of medicinal products is prohibited. Direct-to-consumer advertising of prescription-only medicinal products is also prohibited in the E.U. Violations of the rules governing the promotion of medicinal products in the E.U. could be penalized by administrative measures, fines and imprisonment. These laws may further limit or restrict the advertising and promotion of our products to the general public and may also impose limitations on our promotional activities with health care professionals.

Anti-Corruption Legislation

Our business activities outside of the U.S. are subject to anti-bribery or anti-corruption laws, regulations, industry self-regulation codes of conduct, and physicians' codes of professional conduct or rules of other countries in which we operate, including the U.K. Bribery Act of 2010.

Interactions between pharmaceutical companies and physicians are also governed by strict laws, regulations, industry self-regulation codes of conduct and physicians' codes of professional conduct developed at both the E.U. level and in the individual E.U. Member States. The provision of benefits or advantages to physicians to induce or encourage the prescription, recommendation, endorsement, purchase, supply, order or use of medicinal products is prohibited in the E.U. The provision of benefits or advantages to physicians is also governed by the national anti-bribery laws of the E.U. Member States. Violation of these laws could result in substantial fines and imprisonment. Payments made to physicians in certain E.U. Member States also must be publicly disclosed. Moreover, agreements with physicians must often be the subject of prior notification and approval by the physician's employer, his/her competent professional organization, and/or the competent authorities of the individual E.U. Member States. These requirements are provided in the national laws, industry codes or professional codes of conduct, applicable in the individual E.U. Member States. Failure to comply with these requirements could result in reputational risk, public reprimands, administrative penalties, fines or imprisonment.

Data Privacy and Protection

Data protection laws and regulations have been adopted at the E.U. level, with related implementing laws in individual E.U. Member States which impose significant compliance obligations. The E.U. has adopted a comprehensive overhaul of its data protection regime from an E.U. Data Protection Directive with national legislative approaches to a single European Economic Area Privacy Regulation, the General Data Protection Regulation 2016/679/E.U. (GDPR), which came into effect on May 25, 2018. The GDPR extends the scope of the E.U. data protection law to the processing of personal data carried out by companies not established in the E.U., where such processing relates to (a) the offering of goods or services to data subjects who are in the E.U., or (b) the monitoring of the behavior of data subjects who are in the E.U. It imposes a strict data protection compliance regime with severe penalties of up to the greater of 4% of total worldwide annual turnover of the preceding financial year and €20 million, and it provides for new rights (such as the "right to be forgotten" and "portability" of personal data), obligations related to the implementation of appropriate security measures, personal data breach notification requirements, as well as restrictions on the processing of health data. E.U. Member States may also impose additional requirements in relation to health, genetic and biometric data through their national implementing legislation.

Furthermore, there is a growth towards the public disclosure of clinical trial data in the E.U. which also adds to the complexity of processing health data from clinical trials. Such public disclosure obligations are provided in the new E.U. Clinical Trials Regulation, EMA disclosure initiatives, and voluntary commitments by industry. Data protection authorities from the different E.U. Member States may interpret the GDPR differently, which adds to the complexity of processing personal data in the E.U., and guidance on implementation and compliance practices are often updated or otherwise revised.

In addition, the GDPR imposes specific restrictions on transfer of personal data to countries outside of the EEA that are not considered by the European Commission to provide an adequate level of data protection, which includes the U.S. Appropriate safeguards are required to enable such transfers. Among the appropriate safeguards that can be used, the data exporter may use standard contractual clauses (SCCs). In this respect, recent legal developments in Europe have created complexity and compliance uncertainty regarding certain transfers of personal data from the EEA. In particular, on July 16, 2020, the Court of Justice of the European Union (CJEU) invalidated the E.U.-U.S. Privacy Shield Framework (the Privacy Shield) under which personal data could be transferred from the EEA to U.S. entities who had self-certified under the Privacy Shield program. While the CJEU upheld the adequacy of the SCCs as an adequate personal data transfer mechanism, it specified that their use must be assessed on a case-by-case basis. When relying on SCCs, the data exporters are also required to conduct a transfer risk assessment to verify if anything in the law and/or practices of the destination country may impinge on the effectiveness of the SCCs in the context of the transfer at stake and, if so, to identify and adopt supplementary measures that are necessary to bring the level of protection of the data transferred to the E.U. standard of essential equivalence. Where no supplementary measure is suitable, the data exporter should avoid, suspend or terminate the transfer.

UK

Since the UK formally left the E.U. on January 31, 2020 (Brexit) and the transition period during which E.U. laws continued to apply to the United Kingdom expired on December 31, 2020, E.U. laws now only apply to the UK with respect to Northern Ireland, as laid out in the Protocol on Ireland and Northern Ireland. The E.U. and UK have concluded a trade and cooperation agreement (TCA), which entered into force on May 1, 2021.

The TCA includes provisions affecting the life sciences sector (including on customs and tariffs) but areas for further discussion between the E.U. and UK remain. In addition, there are some specific provisions concerning pharmaceuticals. These include the mutual recognition of GMP, inspections of manufacturing facilities for medicinal products and GMP documents issued. The TCA does not, however, contain wholesale mutual recognition of UK and E.U. pharmaceutical regulations and product standards.

Since January 1, 2021, the E.U. laws which have been transposed into UK law through secondary legislation continue to be applicable as "retained EU law." As there is no general power to amend these regulations, the UK government has adopted the Medicines and Medical Devices Act 2021 (MMDA), which seeks to address this regulatory gap through introducing regulation-making, delegated powers covering the fields of human medicines, clinical trials of human medicines, veterinary medicines and medical devices. The purpose of the MMDA is to enable the existing regulatory frameworks to be updated, with the powers granted under it only exercisable in relation to four pieces of legislation: the Human Medicines Regulations 2012, the Medicines for Human Use (Clinical Trials) Regulations 2004, the Medicines (Products for Human Use) Regulations 2016 and limited parts of the Medicines Act 1968 (specifically those parts which make provision related to pharmacies). It is then further restricted to amending or updating only those provisions stated in the act, which include clinical trials.

Specified provisions of the MMDA entered into force on February 11, 2021 when the legislation formally became law. The remaining provisions came into effect within two months of February 11, 2021 or will come into effect otherwise as stipulated in subsequent statutory instruments.

On September 22, 2022, the Retained EU Law (Revocation and Reform) Bill was introduced to the UK Parliament. It is not clear if the Bill will come into effect but, if passed in its current form, it would automatically revoke most retained E.U. law at the end of 2023 as part of a "sunset clause." This would not apply to retained EU law that was domestic primary legislation. The possibility of an automatic withdrawal of a multiplicity of retained EU law provisions could create significant legislative uncertainty and could have a negative impact on our business operations.

Additionally, following Brexit, companies also have to comply with the UK's data protection laws, including the UK GDPR, which is based on the GDPR.

Privacy and Security of Health Information and Personal Information; Standard Transactions

We are subject to state and federal laws and implementing regulations relating to the privacy and security of the medical information of the patients we treat. The principal federal legislation is the Health Insurance Portability and Accountability Act of 1996, as amended by the Health Information Technology for Economic and Clinical Health Act of 2009 (collectively, HIPAA). Pursuant to HIPAA, the Secretary of the Department of Health and Human Services (HHS), has issued final regulations designed to improve the efficiency and effectiveness of the healthcare system by facilitating the electronic exchange of information in certain financial and administrative transactions, while protecting the privacy and security of the patient information exchanged. State statutes and regulations also regulate the privacy and security of patients' medical information, and these laws vary from state to state, are sometimes contradictory with one another, and are often more restrictive than HIPAA. International regulations (such as the GDPR and UK GDPR) also provide privacy protection to clinical trial participants of their personal health care information. We intend to take appropriate steps to protect the privacy of our clinical study participants. However, the documentation and process requirements of applicable privacy and security regulations are complex and subject to interpretation. Failure to comply with applicable privacy and security regulations could subject us to sanctions or penalties, loss of business and negative publicity.

Federal and State Fraud and Abuse Laws

The federal healthcare Anti-Kickback Statute prohibits, among other things, knowingly and willfully offering, paying, soliciting, or receiving remuneration to induce referrals or in return for purchasing, leasing, ordering, or arranging for the purchase, lease, or order of any healthcare item or service reimbursable under a governmental payor program. The definition of "remuneration" has been broadly interpreted to include anything of value, including gifts, discounts, the furnishing of supplies or equipment, credit arrangements, payments of cash, waivers of payments, ownership interests, opportunity to earn income, and providing anything at less than its fair market value. The Anti-Kickback Statute is broad, and it prohibits many arrangements and practices that are lawful in businesses outside of the healthcare industry. Recognizing that the Anti-Kickback Statute is broad and may technically prohibit many innocuous or beneficial arrangements within the healthcare industry, HHS has issued a series of regulatory "safe harbors." These safe harbor regulations set forth certain provisions that, if met, will provide healthcare providers and other parties with an affirmative defense against prosecution under the federal Anti-Kickback Statute. Although full compliance with these provisions ensures against prosecution under the federal Anti-Kickback Statute, the failure of a transaction or arrangement to fit within a specific safe harbor does not necessarily mean that the transaction or arrangement is illegal or that prosecution under the federal Anti-Kickback Statute will be pursued.

From time to time, the Office of Inspector General, (OIG), issues alerts and other guidance on certain practices in the healthcare industry. In October 1994, the OIG issued a Special Fraud Alert on arrangements for the provision of clinical laboratory services. The Special Fraud Alert set forth a number of practices allegedly engaged in by some clinical laboratories and healthcare providers that raise issues under the "fraud and abuse" laws, including the Anti-Kickback Statute.

Other Healthcare Laws

Our products are subject to various other healthcare-related laws regulating fraud and abuse, R&D, pricing, sales and marketing practices, and the privacy and security of health information. Among other things, these laws and others generally (a) prohibit the provision of anything of value in exchange for the referral of patients or for the purchase, order, or recommendation of any item or service reimbursed by a federal healthcare program, including Medicare and Medicaid; (b) require that claims for payment submitted to federal healthcare programs be truthful; and (c) require the maintenance of certain government licenses and permits. Specific health-care laws and regulations that we are subject to include:

- the federal Physician Self-Referral Law, which prohibits a physician from making referrals for certain designated health services payable by Medicare to an entity with which he or she (or an immediate family member) has a financial relationship, and prohibits the entity from

presenting or causing to be presented claims to Medicare for those referred services;

- the federal civil and criminal false claims laws, including the False Claims Act ("FCA"), which prohibits, among other things, individuals or entities from knowingly presenting, or causing to be presented, claims for payment from Medicare, Medicaid or other federal healthcare programs that are false or fraudulent. Moreover, the government may assert that a claim including items or services resulting from a violation of the federal Anti-Kickback Statute constitutes a false or fraudulent claim for purposes of the FCA;
- the federal Civil Monetary Penalties Law, which prohibits, among other things, offering or transferring remuneration to a federal healthcare beneficiary that a person knows or should know is likely to influence the beneficiary's decision to order or receive items or services reimbursable by the government from a particular provider or supplier;
- the federal Physician Payments Sunshine Act which requires certain applicable manufacturers of drugs, devices, biologics and medical supplies for which payment is available under certain federal healthcare programs, to monitor and report to CMS, certain payments and other transfers of value to physicians (defined to include doctors, dentists, optometrists, podiatrists and chiropractors); certain other healthcare providers, including physician assistants, nurse practitioners, clinical nurse specialists, certified nurse anesthetists, certified nurse-midwives, and teaching hospitals; as well as ownership and investment interests held by physicians and their immediate family members;
- U.S. federal consumer protection and unfair competition laws, which broadly regulate marketplace activities that potentially harm customers; and
- state law equivalents of each of the above federal laws, such as anti-kickback and false claims laws, which may apply to item or services reimbursed by any third-party payor, including commercial insurers; state laws requiring device companies to comply with specific compliance standards, restrict payments made to healthcare providers and other potential referral sources, and report information related to payments and other transfers of value to healthcare providers or marketing expenditures and state laws related to insurance fraud in the case of claims involving private insurers.

Compliance

Compliance with government rules and regulations is a significant concern throughout the industry, in part due to evolving interpretations of these rules and regulations. We seek to conduct our business in compliance with all statutes and regulations applicable to our operations. Failure to comply with applicable requirements may subject us to administrative or judicial sanctions, such as clinical holds, refusal of regulatory authorities to approve or authorize pending product applications, warning letters, product recalls, product seizures, total or partial suspension of production or distribution, monetary penalties, injunctions and/or criminal prosecution.

Employees

As of the date of filing this Annual Report, we employ two executive officers and nine full-time employees. We expect that we will hire more employees as we develop our current and future programs.

Our human capital resources objectives include, as applicable, identifying, recruiting, retaining, and incentivizing our management team and our clinical, scientific and other employees and consultants. The principal purposes of our equity and bonus plans are to attract, retain and motivate personnel through the granting of stock-based and cash-based compensation awards, to align our interests and the interests of our stockholders with those of our employees and consultants. The Compensation Committee of our Board of Directors approves associated merit increases and annual incentive bonus payments to our executives during the first quarter annually. When needed, we augment our employee base with outside consultants who specialize in various fields.

Information about our Executive Officers

The names of our executive officers and their ages as of December 31, 2022, are as follows:

Name	Age	Position
Executive Officers:		
Steven C. Quay, M.D., Ph.D.	72	Chairman of the Board, President and Chief Executive Officer
Kyle Guse, Esq., CPA (inactive)	59	Chief Financial Officer, General Counsel and Secretary

Steven C. Quay, M.D., Ph.D. Dr. Quay has served as Chief Executive Officer, President and Chairman of the Board of Directors of the Company since the Company was incorporated in April 2009. Dr. Quay is certified in Anatomic Pathology with the American Board of Pathology, completed both an internship and residency in anatomic pathology at Massachusetts General Hospital, a Harvard Medical School teaching hospital, and is a former faculty member of the Department of Pathology, Stanford University School of Medicine. Dr. Quay is a named inventor on 89 U.S. patents, 810 published international patent applications, and is named inventor on patents covering seven pharmaceutical products that have been approved by the U.S. Food and Drug Administration. Dr. Quay received an M.D. in 1977 and a Ph.D. in 1975 from the University of Michigan. He received his B.A. degree in biology, chemistry and mathematics from Western Michigan University in 1971. He was selected to serve on the Company's Board of Directors because of his role as a founder of the Company, as well as his qualifications as a physician and the principal researcher overseeing the research, preclinical, clinical and regulatory development of the Company's pharmaceutical programs.

Kyle Guse, Esq., CPA (inactive). Mr. Guse has served as Chief Financial Officer, General Counsel and Secretary of the Company since January 2013. His experience includes more than 25 years of counseling life sciences and other rapid growth companies through all aspects of finance, corporate governance, securities laws and commercialization. Mr. Guse has practiced law at several of the largest international law firms, including from January 2012 through January 2013 as a partner at Baker Botts LLP and, prior to that, from October 2007 to January 2012, as a partner at McDermott Will & Emery LLP. Before working at McDermott Will & Emery, Mr. Guse previously served as a partner at Heller Ehrman LLP. Mr. Guse began his career as an accountant at Deloitte & Touche and he is a licensed Certified Public Accountant (inactive) and member of the Bar in the State of California. Mr. Guse earned a B.S. in business administration and an M.B.A. from California State University, Sacramento, and a J.D. from Santa Clara University School of Law.

Insurance

We currently maintain director's and officer's insurance, commercial general and office premises liability insurance, insurance on our clinical studies, and product errors and omissions liability insurance for our products.

ITEM 1A. RISK FACTORS

Summary Risk Factors

Our business is subject to a number of risks, including risks that may prevent us from achieving our business objectives or may adversely affect our business, clinical and commercialization activities, the manufacturing of our product candidates, intellectual property, third-party relationships, competition factors, product and environmental liability, and common stock. These risks are discussed more fully below and include, but are not limited to, risks related to:

Risks Relating to our Business

- We have only a limited operating history, and, as such, an investor cannot assess our profitability or performance based on past results.
- We have not established sources of ongoing revenue to cover operating costs and allow us to continue as a going concern.
- We will need to raise substantial additional capital in the future to fund our operations and we may be unable to raise such funds when needed and on acceptable terms.
- We may expend our capital resources in ways that you don't agree or that don't produce stockholder value.
- We have a history of operating losses, and we expect to continue to incur losses in the future.
- Any products we may develop may never achieve significant commercial market acceptance.
- We may be unable to establish sales, marketing and commercial supply capabilities.
- The loss of the services of our Chief Executive Officer could adversely affect our business.
- Our acquisitions of, collaborations with, licenses with and investments in, other businesses may not yield expected benefits and our inability to successfully integrate these transactions may negatively impact our business, financial condition, and results of operations.
- We may experience difficulty in locating, attracting, and retaining experienced and qualified personnel, which could adversely affect our business.
- Compounds and methods that appear promising in research and development may fail to reach later stages of development for a number of reasons, including, among others, that clinical trials may take longer to complete than expected or may not be completed at all, and interim, top-line or preliminary clinical trial data reports may ultimately differ from actual results once data are more fully evaluated.
- We may not obtain or maintain the regulatory approvals required to develop or commercialize some or all of our products.
- We are developing our products for patients who are severely ill, and patient deaths that occur in our clinical trials could negatively impact our business even if such deaths are not shown to be related to our drugs.
- We are dependent on third-party service providers for a number of critical operational activities including, in particular, for the manufacture and testing of our products and associated supply chain operations, as well as for clinical trial activities. Any failure or delay in these undertakings by third parties could harm our business.
- We may encounter delays in our clinical trials or may not be able to conduct our trials in a timely manner.
- Our clinical trials may fail to demonstrate adequately the efficacy and safety of our product candidates, which would prevent or delay regulatory approval and commercialization.
- Our products and services may expose us to possible litigation and product liability claims.
- Business disruptions, including natural disasters and pandemics, could seriously harm our future revenue and financial condition and increase our costs and expenses.
- Our ability to use net operating loss carryforwards and research tax credits to reduce future tax payments may be limited or restricted.

Risks Related to our Intellectual Property

- If we are not able to protect our proprietary technology, others could compete against us more directly, which would harm our business.
- 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.
- Changes in U.S. patent law could diminish the value of patents in general, thereby impairing our ability to protect our products.

- We may not be able to protect our intellectual property rights throughout the world.
- Our current patent portfolio may not include all patent rights needed for the full development and commercialization of our products. We cannot be sure that patent rights we may need in the future will be available for license on commercially reasonable terms, or at all.
- Third-party claims alleging intellectual property infringement may prevent or delay our drug discovery and development efforts.
- We cannot assure you that our current or future products will not infringe on existing or future patents. We may not be aware of patents that have already issued that a third-party might assert are infringed by one of our current or future products.
- We may be subject to claims that our employees, consultants or independent contractors have wrongfully used or disclosed confidential information of third parties.
- We may be unable to adequately prevent disclosure of trade secrets and other proprietary information.

Risks Related to Our Industry

- Legislative or regulatory reforms may make it more difficult and costly for us to obtain regulatory approval of our product candidates and to manufacture, market and distribute our products after approval is obtained.
- Our inadvertent or unintentional failure to comply with the complex government regulations concerning patients' privacy, data subjects, and of medical records could subject us to fines and adversely affect our reputation.
- If we experience a significant disruption in our information technology systems or breaches of data security, our business could be adversely affected.
- The failure to comply with complex federal and state laws and regulations related to submission of claims for services could result in significant monetary damages and penalties and exclusion from the Medicare and Medicaid programs.
- We face significant competition from other biotechnology and pharmaceutical companies.
- Our employees and third-party partners may engage in misconduct or other improper activities, including noncompliance with regulatory standards and requirements.
- Our business involves risk associated with handling hazardous and other dangerous materials.

Risks Related to the Securities Markets and Investment in our Securities.

- Our shares of common stock are listed on the Nasdaq Capital Market, but we cannot guarantee that we will be able to satisfy the continued listing standards going forward.
- The sale of a substantial number of shares of our common stock into the market may cause substantial dilution to our existing stockholders and the sale, actual or anticipated, of a substantial number of shares of common stock could cause the price of our common stock to decline.
- The trading price of our common stock has been and is likely to continue to be volatile.
- The ownership of our common stock may become concentrated among a small number of stockholders, and if our principal stockholders, directors, and officers choose to act together, they may be able to significantly influence management and operations, which may prevent us from taking actions that may be favorable to stockholders.
- If we are unable to implement and maintain effective internal control over financial reporting in the future, investors may lose confidence in the accuracy and completeness of our financial reports and the trading price of our common stock may be negatively affected.
- Our Stockholder Rights Agreement, the anti-takeover provisions in our governing documents and Delaware law could delay or prevent a change in control which could reduce the market price of our common stock and could prevent or frustrate attempts by our stockholders to replace or remove our current management and the current Board of Directors.
- If securities or industry analysts do not publish research or publish inaccurate or unfavorable research about our business, the price of our common stock and trading volume could decline.

Purchasing shares of common stock is an investment in our securities and involves a high degree of risk and uncertainty. You should carefully consider the following information about these risks and uncertainties, together with the other information contained in this Annual Report on Form 10-K for the year ended December 31, 2022, before purchasing our securities. If any of the following risks and uncertainties actually occur, our business, financial condition and results of operations may suffer. In that case, the market price of our common stock could decline, and you may lose part or all of your investment in our Company. Additional risks and uncertainties of which we are not presently aware or that we currently believe are immaterial may also harm our business and results of operations.

Risks Relating to our Business

We have only a limited operating history, and, as such, an investor cannot assess our profitability or performance based on past results.

Since December 2015, our business has primarily focused on the development of novel therapeutics for the treatment of breast cancer and other breast conditions. Because of our limited operating history, particularly in the area of pharmaceutical development, our revenue and income potential is uncertain and cannot be based on prior results. Any evaluation of our business and prospects must be considered in light of these factors and the risks and uncertainties often encountered by companies in the development stage. Some of these risks and uncertainties include our ability to:

- commence, execute and obtain successful results from our clinical studies;
- obtain regulatory approvals in the U.S. and elsewhere for our pharmaceuticals we are developing;
- work with contract manufacturers to produce our pharmaceuticals under development in clinical and commercial quantities on acceptable terms and in accordance with required standards;
- respond effectively to competition;
- manage our growth in operations;
- respond to changes in applicable government regulations and legislation;
- access additional capital when required;
- execute and successfully integrate strategic transactions, including potential acquisitions or investments; and
- attract and retain key personnel.

We have not established sources of ongoing revenue to cover operating costs and allow us to continue as a going concern.

Although we believe we have sufficient capital resources to fund our operations for at least the next 12 months based on our current business plan, our business plan may change and may require greater expenditures of capital than currently anticipated, in particular, due to expenditures relating to strategic transactions. We have not yet established an ongoing source of revenue sufficient to cover operating costs and allow us to continue as a going concern. Our ability to continue as a going concern is dependent on obtaining adequate capital to fund operating losses until we become profitable. If we are unable to obtain adequate capital on reasonable terms, if at all, including due to macroeconomic factors, such as the inflationary environment and recessionary fears, we may be unable to develop and commercialize our product offerings or increase our geographic reach and we could be forced to cease operations.

We will need to raise substantial additional capital in the future to fund our operations and we may be unable to raise such funds when needed and on acceptable terms.

For the year ended December 31, 2022, we incurred a net loss of approximately $27.0 million, and we have had an accumulated deficit of approximately $156.2 million since inception. As of December 31, 2022, we had cash and cash equivalents of approximately $111.0 million. Because we have no current sources of revenue, we expect that we will need to raise capital again in the future to continue to fund our operations. When we elect to raise additional funds or when additional funds are required, we may raise such funds through public or private equity offerings, debt financings, corporate collaboration and licensing arrangements or other financing alternatives. These financing arrangements may not be available on acceptable terms, if at all. If we are unable to raise additional capital in sufficient amounts or on terms acceptable to us, we may be prevented from developing our pharmaceutical candidates, pursuing acquisitions, and investing in other companies, including as a sponsor or investor in special purpose acquisition companies, licensing, development and commercialization efforts, and our ability to continue our operations, generate revenues, and achieve or sustain profitability may be substantially harmed. We currently have fewer than five million shares of common stock authorized that are not reserved for specific purposes. Although we proposed to our stockholders, at our 2021 and 2022 annual stockholders' meetings and at a special meeting of stockholders held in September 2021, that our amended and restated certificate of incorporation, as amended, be further amended to add additional authorized shares for various potential purposes, including potential capital raising transactions, our stockholders did not approve such proposals and may not approve a similar proposal in the future. A lack of authorized shares may limit our ability to raise capital when needed.

If we raise additional funds by issuing equity securities, our stockholders will experience dilution. Debt financing, if available, would result in increased fixed payment obligations and may involve agreements that include covenants limiting or restricting our ability to take specific actions, such as incurring additional debt, making capital expenditures or declaring dividends. Any debt financing or additional equity, including securities convertible into or exercisable for equity securities, that we raise may contain terms, such as liquidation, conversion and other preferences, that are not favorable to us or our stockholders. If we raise additional funds through collaboration and licensing arrangements with third-parties, it may be necessary for us to relinquish valuable rights to our technologies, future revenue streams or product candidates or to grant licenses on terms that may not be favorable to us. Should the financing we require to sustain our working capital needs be unavailable or prohibitively expensive when we require it, our business, operating results, financial condition and prospects could be materially and adversely affected, and we may be unable to continue our operations.

We may expend our capital resources in ways that you don't agree or that don't produce stockholder value.

We intend to use our capital resources to execute on our business plan, which may include acquiring or in-licensing programs and may also include the internal development of additional programs that may or may not be related to oncology. We may also use our capital resources to invest directly or indirectly in business opportunities in healthcare or other industries, including through purchases of equity in other companies, such as our investment in Dynamic Cell Therapies, Inc. (DCT). These investments may be in special purpose acquisition companies, including either as a sponsor or as an equity investor. Our business plan may evolve to require more capital resources than currently contemplated either because our existing programs progress more quickly or at a greater cost than currently anticipated or because we may add additional programs. Stockholders may not agree with the ways in which we expend our capital resources and our capital deployment activities may not lead to increases in stockholder value.

We have a history of operating losses, and we expect to continue to incur losses in the future.

We have a limited operating history and have incurred net losses each year. Our net loss for the year ended December 31, 2022, was approximately $27.0 million. We will continue to incur further losses in connection with research and development costs for development of our programs, including ongoing and additional clinical studies.

Any products we may develop may never achieve significant commercial market acceptance.

We may not succeed in achieving commercial market acceptance of any of our products. In order to gain market acceptance for the drugs under development, we will need to demonstrate to physicians and other healthcare professionals the benefits of these therapies, including the clinical and economic application for their particular practice, the efficacy and safety and potential advantages compared to alternative therapies. Many physicians and healthcare professionals may be hesitant to introduce new services or techniques into their practice for many reasons, including lack of time and resources, the learning curve associated with the adoption of such new services or techniques into already established procedures, the product's cost, convenience and ease of administration, the then-current standard of care, the strength of marketing and distribution support and the uncertainty of the applicability or reliability of the results of a new product. In addition, the availability of full or even partial payment for our products, whether by third-party payors (e.g., insurance companies), by government payors or the patients themselves, will likely heavily influence physicians' decisions to recommend or use our products.

We may be unable to establish sales, marketing and commercial supply capabilities.

We do not currently have, nor have we ever had, commercial pharmaceutical sales and marketing capabilities. If any of our product candidates become approved, we would need to build these capabilities in order to commercialize our approved product candidates. The process of establishing commercial capabilities will be expensive and time consuming, and may not be successful. Even if we are successful in building these capabilities, we may not be successful in commercializing any of our product candidates.

The loss of the services of our Chief Executive Officer could adversely affect our business.

Our success is dependent in large part upon our ability to execute our business plan, manufacture our pharmaceutical drugs and attract and retain highly skilled professional personnel. In particular, due to the relatively early stage of our business, our future success is highly dependent on the services of Steven C. Quay, our Chief Executive Officer and founder, who provides much of the necessary experience to execute our business plan.

Our acquisitions of, collaborations with, licenses with and investments in, other businesses may not yield expected benefits and our inability to successfully integrate these transactions may negatively impact our business, financial condition, and results of operations.

We anticipate that we will make acquisitions of, collaborations with, licenses with or investments in businesses in the future. We may not realize the anticipated benefits, or any benefits, from these transactions. If we fail to properly evaluate, complete and execute acquisitions, our business may be seriously harmed and our stock price may decline. For us to realize the benefits of future transactions, we must successfully integrate the acquired businesses with ours. Some of the challenges to successful integration include:

- unanticipated costs or liabilities resulting from our acquisitions;
- inability to retain key employees from acquired businesses;
- difficulties integrating acquired operations, personnel, and technologies;
- diversion of management attention from existing business operations and strategy;
- diversion of resources that are needed in other parts of our business;
- potential write-offs of acquired assets;
- inability to maintain relationship partners of the acquired business;
- potential financial and credit risks associated with the acquired business;
- the need to implement controls, procedures, and policies at the acquired company;
- the need to comply with additional laws and regulations applicable to the acquired business; and
- the indirect tax of any such acquisitions.

Our failure to address these risks or other problems encountered in connection with our past or future acquisitions and other transactions could cause us to fail to realize the anticipated benefits of such acquisitions and transactions and negatively impact our business, financial condition, and results of operations.

We may experience difficulty in locating, attracting, and retaining experienced and qualified personnel, which could adversely affect our business.

We will need to attract, retain, and motivate experienced clinical development and other personnel, particularly in the greater Seattle area as we expand our pharmaceutical development activities. Personnel with the required skills and experience may be scarce or may not be available at all in this geographic region. In addition, competition for these skilled personnel is intense and recruiting and retaining skilled employees is difficult, particularly for a development-stage Company such as ours. If we are unable to attract and retain qualified personnel, our development activities may be adversely affected. Even if we are successful in identifying and attracting qualified employees, recent market changes, including the labor shortage, and rising inflation have increased employee-related costs substantially. As a result, our operating expenses may continue to increase in the current market environment.

Compounds and methods that appear promising in research and development may fail to reach later stages of development for a number of reasons, including, among others, that clinical trials may take longer to complete than expected or may not be completed at all, and interim, top-line or preliminary clinical trial data reports may ultimately differ from actual results once data are more fully evaluated.

Successful development of pharmaceutical products is highly uncertain and obtaining regulatory approval to market drugs is expensive, difficult, and speculative. Compounds that appear promising in research and development may fail to reach later stages of development for several reasons, including, but not limited to:

- an unacceptable safety profile;
- lack of efficacy;
- delay or failure in obtaining necessary U.S. and international regulatory approvals, or the imposition of a partial or full regulatory hold on a clinical trial;
- difficulties in formulating a compound, scaling the manufacturing process, timely attaining process validation for particular drug products, and completing manufacturing to support clinical studies;
- pricing or reimbursement issues or other factors that may make the product uneconomical to commercialize;
- production problems, such as the inability to obtain raw materials or supplies satisfying acceptable standards for the manufacture of our products;
- equipment obsolescence, malfunctions or failures, product quality/contamination problems or changes in regulations requiring manufacturing modifications;
- inefficient cost structure of a compound, finished drug, or device compared to alternative treatments;
- obstacles resulting from proprietary rights held by others, such as patent rights for a particular compound;
- lower than anticipated rates of patient enrollment as a result of factors, such as the number of patients with the relevant conditions, the proximity of patients to clinical testing centers, perceived cost/benefit of participating in the study, eligibility criteria for tests, and competition with other clinical testing programs;
- nonclinical or clinical testing requiring significantly more time than expected resources or expertise than originally expected and inadequate financing, which could cause clinical trials to be delayed or terminated;
- failure of clinical testing to show potential products to be safe and efficacious, and failure to demonstrate desired safety and efficacy characteristics in human clinical trials;
- suspension of a clinical trial at any time by us, an applicable collaboration partner or a regulatory authority on the basis that the participants are being exposed to unacceptable health risks or for other reasons;
- delays in reaching or failing to reach agreement on acceptable terms with manufacturers or prospective clinical research organizations (CROs), and trial sites;
- failure of third-parties, such as clinical research organizations, academic institutions, collaborators, cooperative groups, and/or investigator sponsors, to conduct, oversee, and monitor clinical trials and results.

In addition, from time to time we expect to report interim, top-line or “preliminary” data for clinical trials, including for example the results reported in 2021 for our neoadjuvant or “window of opportunity” Phase 2 study of (Z)-endoxifen. Such data are based on a preliminary analysis of then-available efficacy and safety data, and such findings and conclusions are subject to change following a more comprehensive review of the data related to the particular study or trial. Interim, top-line or preliminary data are based on important assumptions, estimations, calculations and information then available to us to the extent we have had, at the time of such reporting, an opportunity to fully and carefully evaluate such information in light of all surrounding facts, circumstances, recommendations and analyses. As a result, interim, top-line or “preliminary” results may differ from future/final results, or different conclusions or considerations may qualify such results once existing data have been more fully evaluated. In addition, third-parties, including regulatory agencies, may not accept or agree with our assumptions, estimations, calculations 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 the particular compound and our business generally.

If the development of our products is delayed or fails, or if top-line or preliminary clinical trial data reported differ from actual results, our development costs may increase and our ability to commercialize our products may be harmed, which could harm our business, financial condition, operating results or prospects.

We may not obtain or maintain the regulatory approvals required to develop or commercialize some or all of our products.

We are subject to rigorous and extensive regulation by the FDA in the U.S. and by comparable agencies in other jurisdictions, including the Europe Medicines Agency (EMA) in the European Union (E.U.), the United Kingdom’s Medicines and Healthcare products Regulatory Agency and the Therapeutic Goods Administration (TGA) in Australia.

Our product candidates are currently in research or development, and we have not received marketing approval for our products. Our products may not be marketed in the U.S. until they have been approved by the FDA and may not be marketed in other jurisdictions until they have received approval from the appropriate foreign regulatory agencies. Each product candidate requires significant research, development and pre-clinical testing and extensive clinical investigation before submission of any regulatory application for marketing approval. As a result, the regulatory pathway for these products may be more complex and obtaining regulatory approvals may be more difficult.

Obtaining regulatory approval requires substantial time, effort and financial resources, and we may not be able to obtain approval of any of our products on a timely basis, or at all. The number, size, design, and focus of pre-clinical and clinical trials that will be required for approval by the FDA, the EMA, or any other foreign regulatory agency varies depending on the compound, the disease or condition that the products are designed to address and the regulations applicable to any particular products. Pre-clinical and clinical data can be interpreted in different ways, which could delay, limit or preclude regulatory approval. The FDA, the EMA, and other foreign regulatory agencies can delay, limit, or deny approval of a product for many reasons, including, but not limited to:

- a product may not be shown to be safe or effective;
- the clinical and other benefits of a product may not outweigh its safety risks;
- clinical trial results may be negative or inconclusive, or adverse medical events may occur during a clinical trial;
- the results of clinical trials may not meet the level of statistical significance required by regulatory agencies for approval;
- regulatory agencies may interpret data from pre-clinical and clinical trials in different ways than we do;
- regulatory agencies may not approve the manufacturing process or determine that the manufacturing is not in accordance with current good manufacturing practices;
- a product may fail to comply with regulatory requirements; or
- regulatory agencies might change their approval policies or adopt new regulations.

If our products are not approved at all or quickly enough to provide net revenues to defray our operating expenses, our business, financial condition, operating results and prospects could be harmed.

We are developing our products for patients who are severely ill, and patient deaths that occur in our clinical trials could negatively impact our business even if such deaths are not shown to be related to our drugs.

We have enrolled patients in studies of our drug candidates who may die while enrolled in our studies. Patients in our clinical trials may also experience adverse outcomes following treatment with our drug candidates, including patient death. These adverse outcomes, even if unrelated to our drugs, could expose us to lawsuits and liabilities and could diminish our ability to obtain regulatory approval and/or achieve commercial acceptance for the related drug and our business could be materially harmed.

We are dependent on third-party service providers for a number of critical operational activities including, in particular, for the manufacture and testing of our products and associated supply chain operations, as well as for clinical trial activities. Any failure or delay in these undertakings by third parties could harm our business.

Our business is dependent on the performance by third-parties of their responsibilities under contractual relationships. In particular, we heavily rely on third-parties for the manufacture and testing of our products. We do not have internal analytical laboratory or manufacturing facilities to allow the testing or production of products in compliance with Good Manufacturing Practices (cGMP). As a result, we rely on third-parties to supply us in a timely manner with manufactured product candidates. We may not be able to adequately manage and oversee the manufacturers we choose; they may not perform as agreed or they may terminate their agreements with us. In particular, we depend on third-party manufacturers to conduct their operations in compliance with current Good Laboratory Practices (GLP) or similar standards imposed by the U.S. and/or applicable foreign regulatory authorities, including the FDA and EMA. Any of these regulatory authorities may take action against a contract manufacturer who violates cGMP. Failure of our manufacturers to comply with FDA, EMA or other applicable regulations may cause us to curtail or stop the manufacture of such products until we obtain regulatory compliance.

We may not be able to obtain sufficient quantities of our products if we are unable to secure manufacturers when needed, or if our designated manufacturers do not have the capacity or otherwise fail to manufacture compounds according to our schedule and specifications or fail to comply with cGMP regulations. Furthermore, in order to ultimately obtain and maintain applicable regulatory approvals, any manufacturers we utilize are required to consistently produce the respective products in commercial quantities and of specified quality or execute fill-finish services on a repeated basis and document their ability to do so, which is referred to as process validation. In order to obtain and maintain regulatory approval of a compound, the applicable regulatory authority must consider the result of the applicable process validation to be satisfactory and must otherwise approve of the manufacturing process. Even if our compound manufacturing processes obtain regulatory approval and sufficient supply is available to complete clinical trials necessary for regulatory approval, there are no guarantees we will be able to supply the quantities necessary to affect a commercial launch of the applicable drug, or once launched, to satisfy ongoing demand. Any product shortage could also impair our ability to deliver contractually required supply quantities to applicable collaborators, as well as to complete any additional planned clinical trials.

We also rely on third-party service providers for certain warehousing and transportation. With regard to the distribution of our drugs, we depend on third-party distributors to act in accordance with Good Distribution Practice (GDP), and the distribution process and facilities are subject to continuing regulation by applicable regulatory authorities with respect to the distribution and storage of products.

In addition, we depend on medical institutions and CROs (together with their respective agents) to conduct clinical trials and associated activities in compliance with Good Clinical Practices (GCP) and data privacy standards such as defined under the Health Insurance Portability and Accountability Act (HIPAA), and General Data Protection Regulation (GDPR) and in accordance with our timelines, expectations and requirements. We are substantially dependent on the organizations conducting our clinical trials. To the extent any such third-parties are delayed in achieving or fail to meet our clinical trial enrollment expectations, fail to conduct our trials in accordance with GCP, patient and data privacy standards such as HIPAA or study protocol or otherwise take actions outside of our control or without our consent, our business may be harmed. Furthermore, we conduct clinical trials in foreign countries, subjecting us to additional risks and challenges, including, patient and data privacy standards such as GDPR and in particular, as a result of the engagement of foreign medical institutions and foreign CROs, who may be less experienced with regard to regulatory matters applicable to us and may have different standards of medical care.

With regard to certain of the foregoing clinical trial operations and stages in the manufacturing and distribution chain of our compounds, we rely on vendors. In most cases we use a primary vendor and have identified, in some cases, secondary vendors. In particular, our current business structure contemplates, at least in the foreseeable future, use of a primary commercial supplier for the (Z)-endoxifen drug substance. The use of primary vendors for core operational activities, such as, manufacturing, and the resulting lack of diversification, exposes us to the risk of a material interruption in service related to these primary, outside vendors. As a result, our exposure to this concentration risk could harm our business.

Although we monitor the compliance of our third-party service providers performing the aforementioned services, we cannot be certain that such service providers will consistently comply with applicable regulatory requirements or that they will otherwise timely satisfy their obligations to us. Any such failure and/or any failure by us to monitor their services or to plan for and manage our short- and long-term requirements underlying such services could result in shortage of the required compound, delays in or cessation of clinical trials, failure to obtain or revocation of product approvals or authorizations, product recalls, withdrawal or seizure of products, suspension of an applicable wholesale distribution authorization, and/or distribution of products, operating restrictions, injunctions, suspension of licenses, other administrative or judicial sanctions (including civil penalties and/or criminal prosecution), and/or unanticipated related expenditures to resolve shortcomings.

Such consequences could have a significant impact on our business, financial condition, operating results, or prospects.

We may encounter delays in our clinical trials or may not be able to conduct our trials in a timely manner.

Clinical trials are expensive and subject to regulatory approvals. Potential trial delays may arise from, but are not limited to:

- the effects of the ongoing coronavirus pandemic, including access to clinical trial sites both by study participants and our clinical research organizations, diversion of healthcare resources to address COVID-19, which could limit the availability of medical facilities for our clinical trials, and supply chain disruptions which could have a material adverse effect on the availability or cost of materials for our product candidates;
- failure to obtain on a timely basis, or at all, approval from the applicable institutional review board or ethics committee to open a clinical study;
- lower than anticipated patient enrollment or delays in patient enrollment, including due to the size and nature of the patient population, existing conditions, patient eligibility criteria defined in the protocol, proximity of patients to trial sites, the design of the trial, our ability to recruit clinical trial investigators with the appropriate competencies and expertise, competing clinical trials for similar or alternate therapeutic treatments, clinicians' and patients' perception of a lack of benefit to enroll in the study for whatever reason, our ability to obtain and maintain patient consents and patients dropping out of the trial;
- delays in reaching agreements on acceptable terms with prospective CRO/vendors;
- failure of CROs or other third-parties to effectively and timely monitor, oversee, and maintain the clinical trials.
- complying with design protocols of any applicable special protocol assessment we receive from the FDA;
- severe or unexpected drug-related side effects experienced by patients in a clinical trial;
- availability of materials provided by third parties necessary to manufacture our product candidates; and
- changes in regulatory requirements, or additional regulatory requirements.

Our clinical trials may fail to demonstrate adequately the efficacy and safety of our product candidates, which would prevent or delay regulatory approval and commercialization.

Even if our clinical trials are completed as planned, we cannot be certain that their results will support our product candidate claims or that the FDA or foreign authorities will agree with our conclusions. Success in pre-clinical studies and early clinical trials does not ensure that later clinical trials will be successful, and we cannot be sure that the later trials will replicate the results of prior trials and pre-clinical studies. The clinical trial process may fail to demonstrate that our product candidates are safe and effective for the proposed indicated uses. If the FDA concludes that our clinical trials have failed to demonstrate safety and effectiveness, we would not receive FDA approval to market that product candidate in the U.S. for the indications sought. In addition, it could cause us to abandon the product candidate and might delay development of other product candidates. Any delay or termination of our clinical trials would delay or preclude the filing of any submissions with the FDA and, ultimately, our ability to commercialize our product candidates and generate revenues. It is also possible that patients enrolled in clinical trials could experience adverse side effects that are not currently part of a product candidate's profile.

Our products and services may expose us to possible litigation and product liability claims.

Our business may expose us to potential product liability risks inherent in the testing, marketing, and processing personalized medical products, particularly those products and services we offered prior to shifting our focus on pharmaceutical development. Product liability risks may arise from, but are not limited to:

- death of severely ill patients participating in our studies; and
- adverse events related to drugs and therapies we are developing.

A successful product liability claim, or the costs and time commitment involved in defending against a product liability claim, could have a material adverse effect on our business. Regardless of the merit or outcome of a claim, it may result in decreased demand for our product candidates, reputational harm, withdrawal of clinical trial participants, investigations by regulators, withdrawal of prior governmental approvals, substantial monetary awards to patients, loss of revenue and the inability to commercialize our product candidates. Although we currently carry clinical trial insurance and product liability insurance which we believe to be reasonable, it may not be adequate to cover all liability that we may incur. An inability to renew our policies or to obtain sufficient insurance at an acceptable cost and on commercially desirable or reasonable terms, if at all, including due to a successful product liability claim, could prevent or inhibit the commercialization of our products.

Business disruptions, including natural disasters and pandemics, could seriously harm our future revenue and financial condition and increase our costs and expenses.

Our operations are based primarily in Seattle, Washington. These operations could be subject to power shortages, telecommunications failures, water shortages, floods, earthquakes, fires, extreme weather conditions, pandemics or epidemics and other natural or man-made disasters or business interruptions, for which we maintain customary insurance policies that we believe are appropriate. In addition, outbreaks of viruses, infectious diseases or pandemics (including, COVID-19), terrorist acts or acts of war, could cause damage or cause disruptions to us, our employees, facilities, contractors and collaborators, which could have a material adverse effect on our business, financial condition and results of operations. The occurrence of any of these business disruptions could seriously harm our operations and financial condition and increase our costs and expenses. Our ability to manufacture clinical supplies of our product candidates could be disrupted if our suppliers are affected by any of the above events. We may have limited recourse against third parties if the non-compliance is due to factors outside of the manufacturer’s control.

Our ability to use net operating loss carryforwards and research tax credits to reduce future tax payments may be limited or restricted.

We have generated significant net operating loss carryforwards (NOLs), and research and development tax credits (R&D credits) as a result of our incurrence of losses and our conduct of research activities since inception. We generally are able to carry NOLs and R&D credits forward to reduce our tax liability in future years. However, our ability to utilize the NOLs and R&D credits is subject to the rules of Sections 382 and 383 of the Internal Revenue Code of 1986, as amended (the Code), respectively. Those sections generally restrict the use of NOLs and R&D credits after an “ownership change.” An ownership change occurs if, among other things, the stockholders (or specified groups of stockholders) who own or have owned, directly or indirectly, 5% or more of a corporation’s common stock or are otherwise treated as 5% stockholders under Section 382 of the Code and the U.S. Treasury Department regulations promulgated thereunder increase their aggregate percentage ownership of that corporation’s stock by more than 50 percentage points over the lowest percentage of the stock owned by these stockholders over the applicable testing period. In the event of an ownership change, Section 382 of the Code imposes an annual limitation on the amount of taxable income a corporation may offset with NOL carry forwards and Section 383 of the Code imposes an annual limitation on the amount of tax a corporation may offset with business credit (including R&D credits) carryforwards.

We have experienced ownership changes in the past, and there can be no assurance that we will not experience ownership changes in the future. As a result, our NOLs and business credits (including R&D credits) may be subject to limitations, and we may be required to pay taxes earlier and in larger amounts than would be the case if our NOLs or R&D credits were freely usable.

Risks Related to our Intellectual Property

If we are not able to protect our proprietary technology, others could compete against us more directly, which would harm our business.

Our commercial success will depend, in part, on our ability to obtain additional patents and licenses and to protect our existing patent position, both in the U.S. and in other countries, for therapeutics and related technologies, processes, methods, compositions, and other inventions that we believe are patentable, all of which provide limited protection and may not adequately protect our rights or permit us to gain or keep any competitive advantage. As of January 31, 2023, we own and are pursuing 75 pending provisional and non-provisional patent applications (19 U.S., including one allowed U.S. application, and 56 international applications, including two allowed international applications) and two issued patents (one U.S. patent issued in February 2023 and one international patent). We continue to evaluate the full range of our technologies and file new patent applications.

Our ability to preserve our trade secrets, trademarks and other intellectual property rights is also important to our long-term success. Our success depends in part on obtaining patent protection for our products and processes, preserving trade secrets, patents, copyrights and trademarks, operating without infringing the proprietary rights of third-parties, and acquiring licenses for technology or products. If we do not adequately protect our intellectual property, competitors may be able to use our technologies and erode or negate any competitive advantage we may have, which could harm our business and ability to establish or maintain profitability. Patents may also be issued to third-parties, which could interfere with our ability to bring our therapeutics to market. As the patent landscape for products for breast disorders, including breast cancers, grows more crowded and becomes more complex we may find it more difficult to obtain patent protection for our products, including those related to (Z)-endoxifen.

The laws of some foreign countries do not protect our proprietary rights to the same extent as U.S. laws, and we may encounter significant problems in protecting our proprietary rights in these countries. Even in the U.S., the patent positions of diagnostic companies and pharmaceutical and biotechnology companies, including our patent position, are generally highly uncertain, particularly after the Supreme Court decisions *Mayo Collaborative Services v. Prometheus Laboratories*, 132 S. Ct. 1289 (2012), *Association for Molecular Pathology v. Myriad Therapeutics, Inc.*, 133 S. Ct. 2107 (2013), and *Alice Corp. v. CLS Bank International*, 134 S. Ct. 2347 (2014), and the Federal Circuit Court decisions *Athena Diagnostics, Inc. v. Mayo Collaborative Servs., LLC*, 915 F.3d 743 (Fed. Cir. 2019) and *Amgen Inc. v. Sanofi*, 987 F.3d 1080 (Fed. Cir. 2021). Our patent positions also involve complex legal and factual questions, for which important legal principles remain unresolved. No consistent policy regarding the breadth of claims allowed in pharmaceutical and biotechnology companies' patents has emerged to date in the U.S. Furthermore, in the biotechnology and pharmaceutical fields, courts frequently render opinions that may affect the patentability of certain inventions or discoveries, including opinions that may affect the patentability of methods for diagnostics, personalized medicine, and analysis and comparison of DNA and, therefore, any patents issued to us may be challenged and potentially invalidated or found ineligible. We will be able to protect our proprietary rights from unauthorized use by third- parties only to the extent that our proprietary technologies and any future tests and products are covered by valid and enforceable patents or are effectively maintained as trade secrets. In addition, our patent applications may never issue as patents, and the claims of any issued patents may not afford meaningful protection for our products, technology or tests.

The degree of future protection for our proprietary rights is uncertain, and we cannot ensure that:

- we or others were the first to make the inventions covered by each of our patent applications;
- we or others were the first to file patent applications for our claimed inventions;
- others will not independently develop similar or alternative technologies or duplicate any of our technologies;
- any of our patent applications will result in issued patents;
- other parties will not challenge any patents issued to us;
- any of our patents will be valid or enforceable;
- any patents issued to us and collaborators will provide a basis for commercially viable therapeutics, will provide us with any competitive advantages or will not be challenged by third-parties; or
- the patents of others will not have an adverse effect on our business.

If a third-party files a patent application with claims to a drug we have discovered or developed, a derivation proceeding may be initiated regarding competing patent applications. If a derivation proceeding is initiated, we may not prevail in the derivation proceeding. If the other party prevails in the derivation proceeding, we may be precluded from commercializing our products, or may be required to seek a license. A license may not be available to us on commercially acceptable terms, if at all.

Any litigation proceedings relating to our proprietary technology may fail and, even if successful, may result in substantial costs and distract our management and other employees. Furthermore, because of the substantial amount of discovery required in connection with intellectual property litigation, there is a risk that some of our confidential information could be compromised by disclosure during this type of litigation. In addition, there could be public announcements of the results of hearings, motions or other interim proceedings or developments. If securities analysts or investors perceive these results to be negative, it could have a substantial adverse effect on the price of our common stock. Finally, we may not be able to prevent, alone or with the support of our licensors, if any, misappropriation of our trade secrets or confidential information, particularly in countries where the laws may not protect those rights as fully as in the U.S.

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.

United States Patent and Trademark Office (USPTO) and various foreign governmental patent agencies require compliance with a number of procedural, documentary, fee payment and other similar provisions during the patent process. Periodic maintenance fees, renewal fees, annuity fees, and various other governmental fees on any issued patents and/or applications are due to be paid to the USPTO and foreign patent agencies in several stages over the lifetime of the patents and/or applications. We have systems in place to remind us to pay these fees, and we employ outside firms and rely on our outside counsel to pay these fees. While an inadvertent lapse may sometimes be cured by payment of a late fee or by other means in accordance with the applicable rules, there are situations in which noncompliance can result in abandonment or lapse of the patent or patent application, resulting in partial or complete loss of patent rights in the relevant jurisdiction. In such an event, our competitors might be able to enter the market earlier than should otherwise have been the case, which would have a material adverse effect on our business.

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

As is the case with other biotechnology and pharmaceutical companies, our success is heavily dependent on our intellectual property, particularly on obtaining and enforcing patents. Obtaining and enforcing patents in the biotechnology and pharmaceutical industries involve both technological and legal complexity, and is therefore costly, time-consuming and inherently uncertain. For the past several years, the U.S. has conducted proceedings involving post-issuance patent review procedures, such as *inter partes* review (IPR), and post-grant review and covered business methods. These proceedings are conducted before the Patent Trial and Appeal Board (PTAB), of the USPTO. Each proceeding has different eligibility criteria and different patentability challenges that can be raised. In this regard, the IPR process permits any person (except a party who has been litigating the patent for more than a year) to challenge the validity of a U.S. patent on the grounds that it was anticipated or made obvious by prior art consisting of patents or printed publications. As a result, non-practicing entities associated with hedge funds, pharmaceutical companies who may be our competitors and others have challenged certain valuable pharmaceutical U.S. patents based on prior art through the IPR process. A decision in such a proceeding adverse to our interests could result in the loss of valuable patent rights, which would have a material adverse effect on our business, financial condition, results of operations and growth prospects. Any potential future changes to the U.S. patent system could increase the uncertainties and costs surrounding the prosecution of our patent applications and the enforcement or defense of our issued patents, all of which could have a material adverse effect on our business, financial condition, results of operations and growth prospects. Further, 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. In particular, on March 20, 2012, the U.S. Supreme Court issued the *Mayo Collaborative Services v. Prometheus Laboratories, Inc.* decision, holding that several claims drawn to measuring drug metabolite levels from patient samples were not patentable subject matter. The full impact of the *Mayo Collaborative Services v. Prometheus Laboratories, Inc.* decision on diagnostic and certain method claims is uncertain. In addition to increasing uncertainty with regard to our ability to obtain patents in the future, this combination of events has created uncertainty with respect to the value of patents once obtained. Depending on decisions by the U.S. Congress, the federal courts, and the USPTO, the laws and regulations governing patents could change in unpredictable ways that could weaken our ability to obtain new patents or to enforce our existing patents and patents that we might obtain in the future. The standards that courts use to interpret patents are not always applied predictably or uniformly and may evolve, particularly as new technologies develop. In addition, changes to patent laws in the U.S. or other countries may be applied retroactively to affect the validity, enforceability, or term of our patent. For example, the U.S. Supreme Court has modified some legal standards applied by the USPTO in examination of U.S. patent applications, which may decrease the likelihood that we will be able to obtain patents and may increase the likelihood of challenges to patents we obtain or license.

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

Filing, prosecuting and defending patents on our products in all countries throughout the world would be prohibitively expensive. In addition, the laws of some foreign countries do not protect intellectual property rights in the same manner and to the same extent as laws in the U.S. Consequently, we may not be able to prevent third-parties from practicing our inventions in all countries outside the U.S. 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 of such patent protection is not as strong as that in the U.S. These products may compete with our products and services, and our patents or other intellectual property rights may not be effective or sufficient to prevent them from competing with our products.

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 and services 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 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.

Our current patent portfolio may not include all patent rights needed for the full development and commercialization of our products. We cannot be sure that patent rights we may need in the future will be available for license on commercially reasonable terms, or at all.

We may be unable to obtain any licenses or other rights to patents, technology, or know-how from third-parties necessary to conduct our business and such licenses, if available at all, may not be available on commercially reasonable terms. Others may seek licenses from us for other technology we use or intend to use. Any failure to obtain such licenses could delay or prevent us from developing or commercializing our proposed products, which would harm our business. We may not be able to secure such a license on acceptable terms. Litigation or patent derivation proceedings may need to be brought against third-parties, as discussed below, to enforce any of our patents or other proprietary rights, or to determine the scope and validity or enforceability of the proprietary rights of such third-parties.

Third-party claims alleging intellectual property infringement may prevent or delay our drug discovery and development efforts.

Our commercial success depends in part on our avoiding infringement of the patents and proprietary rights of third-parties, including the intellectual property rights of competitors. There is a substantial amount of litigation, both within and outside the U.S., involving patents and other intellectual property rights in the medical device and pharmaceutical fields, as well as administrative proceedings for challenging patents, including *inter partes* review, post-grant review, derivation, and reexamination proceedings before the USPTO or oppositions and other comparable proceedings in various foreign jurisdictions. These procedures bring uncertainty to the possibility of challenges to our patents in the future, including those patents perceived by our competitors as blocking entry into the market for their products, and the outcome of such challenges. 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 developing our products. As the medical device, biotechnology, and pharmaceutical industries expand and more patents are issued, the risk increases that our activities related to our products may give rise to claims of infringement of the patent rights of others.

We cannot assure you that our current or future products will not infringe on existing or future patents. We may not be aware of patents that have already issued that a third-party might assert are infringed by one of our current or future products.

Third-parties may assert that we are employing their proprietary technology without authorization. There may be third-party patents of which we are currently unaware with claims to materials, formulations, methods of manufacture, or methods for treatment related to the use or manufacture of our products. Because patent applications can take many years to issue and may be confidential for eighteen months or more after filing, there may be currently pending third-party patent applications which may later result in issued patents that our products may infringe, or which such third-parties claim are infringed by our products and services.

Parties making claims against us for infringement or misappropriation of their intellectual property rights may seek and obtain injunctive or other equitable relief, which could effectively block our ability to further develop and commercialize our products. Defense of these claims, regardless of their merit, would involve substantial expenses and would be a substantial diversion of employee resources from our business. In the event of a successful claim of infringement against us by a third-party, we may have to (i) pay substantial damages, including treble damages and attorneys' fees if we are found to have willfully infringed the third-party's patents; (ii) obtain one or more licenses from the third-party; (iii) pay royalties to the third-party; or (iv) redesign any infringing products. Redesigning any infringing products may be impossible or require substantial time and monetary expenditure. Further, we cannot predict whether any required license would be available at all or whether it would be available on commercially reasonable terms. In the event that we could not obtain a license, we may be unable to further develop and commercialize our products, which could harm our business significantly. Even if we were able to obtain a license, the rights may be nonexclusive, which would give our competitors access to the same intellectual property.

In addition to infringement claims against us, if third-parties have prepared and filed patent applications in the U.S. that also claim technology related to our products, we may have to participate in derivation proceedings in the USPTO to determine the priority of invention. We may also become involved in similar proceedings in the patent offices in other jurisdictions regarding our intellectual property rights with respect to our products and technology.

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

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

We may be unable to adequately prevent disclosure of trade secrets and other proprietary information.

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 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 require 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. However, we cannot be certain that all such confidentiality agreements have been duly executed, 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. 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 taken to maintain our trade secrets are deemed inadequate, we may have insufficient recourse against third-parties for misappropriating the trade secret.

Risks Related to Our Industry

Legislative or regulatory reforms may make it more difficult and costly for us to obtain regulatory approval of our product candidates and to manufacture, market and distribute our products after approval is obtained.

From time to time, legislation is drafted and introduced in Congress that could significantly change the statutory provisions governing the regulatory approval, manufacture and marketing of regulated products or the reimbursement thereof. In addition, FDA regulations and guidance are often revised or reinterpreted by the FDA in ways that may significantly affect our business and our products. Any new regulations or revisions or reinterpretations of existing regulations may impose additional costs or lengthen review times of future products. In addition, FDA regulations and guidance are often revised or reinterpreted by the agency in ways that may significantly affect our business and our products. It is impossible to predict whether legislative changes will be enacted or FDA regulations, guidance or interpretations changed, and what the impact of such changes, if any, may be. Similar changes and revisions can also occur in foreign countries.

For example, the FDA may change its clearance and approval policies, adopt additional regulations or revise existing regulations, or take other actions which, may prevent or delay approval or clearance of our products under development or impact our ability to modify our currently cleared products on a timely basis. Any change in the laws or regulations that govern the clearance and approval processes relating to our current and future products could make it more difficult and costly to obtain clearance or approval for new products, or to produce, market and distribute existing products. Significant delays in receiving clearance or approval, or the failure to receive clearance or approval for our new products would have an adverse effect on our ability to expand our business.

Our inadvertent or unintentional failure to comply with the complex government regulations concerning patients' privacy, data subjects, and of medical records could subject us to fines and adversely affect our reputation.

Federal privacy regulations, among other things, restrict our ability to use or disclose protected health information in the form of patient-identifiable laboratory data, without written patient authorization, for purposes other than payment, treatment, or healthcare operations as defined under HIPAA, except for disclosures for various public policy purposes and other permitted purposes outlined in the privacy regulations. Applicable privacy regulations provide for significant fines and other penalties for wrongful use or disclosure of protected health information, including potential civil and criminal fines and penalties. Although HIPAA and its implementing regulations do not expressly provide for a private right of damages, we could incur damages under state laws, for example, the California Consumer Privacy Act, as amended by the California Privacy Rights Act to private parties for the wrongful use or disclosure of confidential health information or other personal information.

We intend to implement policies and practices that we believe will make us compliant with applicable privacy regulations. However, the documentation and process requirements of applicable privacy regulations are complex and subject to interpretation. Failure to comply with applicable privacy regulations could subject us to sanctions or penalties, loss of business, and negative publicity.

The HIPAA privacy regulations establish a “floor” of minimum protection for patients as to their medical information and do not supersede state laws that are more stringent. Therefore, we are required to comply with both HIPAA privacy regulations and various state privacy laws, which vary from state to state, are sometimes contradictory with one another, and are often more restrictive than HIPAA. Additionally, the documentation and process requirements of such laws are complex and subject to interpretation. The failure to comply with applicable privacy laws could subject us to regulatory actions, including significant fines or penalties, and to private actions by patients, as well as to adverse publicity and possible loss of business. In addition, federal and state laws and judicial decisions provide individuals with various rights for violation of the privacy of their medical information by healthcare providers such as us.

The collection and processing of personal data, including personal health data related to individuals in the E.U. regardless of citizenship or residence is governed by the provisions of the General Data Protection Regulation 2016/679 (GDPR) which provides for significant penalties for noncompliance. GDPR supersedes the Directive 95/46/EC of the European Parliament and of the Council of 24 October 1995. The GDPR regulates (i) the processing of personal data carried out in the context of the activities of a company established in the E.U.; and (ii) the processing of personal data carried out by a company not established in the E.U. where such processing relates to (a) the offering of goods or services to data subjects who are in the E.U. or (b) the monitoring of the behavior of data subjects who are in the E.U. The GDPR imposes a number of requirements, including an obligation to rely on a legal basis (such as the consent of individuals to whom the personal data relates), the information that must be provided to the individuals, notification obligations to the competent national data protection authorities, and the security and confidentiality of the personal data. E.U. Member States may also impose additional requirements in relation to health, genetic and biometric data through their national implementing legislation.

Further, from January 1, 2021, companies have to comply with the GDPR and also the United Kingdom GDPR, or UK GDPR, which, together with the amended UK Data Protection Act 2018, retains the GDPR in UK national law. The UK GDPR mirrors the fines under the GDPR, i.e., fines up to the greater of £17.5 million or 4% of global turnover. The European Commission has adopted an adequacy decision in favor of the UK, enabling data transfers from E.U. member states to the UK without additional safeguards. However, the UK adequacy decision will automatically expire in June 2025 unless the European Commission re-assesses and renews/ extends that decision and remains under review (and may be modified or revoked) by the Commission during this period. The relationship between the UK and the E.U. in relation to certain aspects of data protection law remains unclear, and it is unclear how UK data protection laws and regulations will develop in the medium to longer term, and how data transfers to and from the UK will be regulated in the long term. These changes may lead to additional costs and increase our overall risk exposure.

Failure to comply with the requirements of GDPR and/or UK GDPR, and the related national data protection laws of the E.U. Member States or the UK may result in fines and other administrative penalties, litigation, government enforcement actions (which could include civil and/or criminal penalties), and harm our business. Moreover, patients about whom we or our partners obtain information, as well as the providers who share this information with us, may have contractual rights that may limit our ability to use this information. Claims that we have violated patient’s or any individual’s rights or breached our contractual obligations, even if ultimately we are not found liable, could be expensive and time-consuming to defend, and could result in adverse publicity and harm our business.

If we experience a significant disruption in our information technology systems or breaches of data security, our business could be adversely affected.

We rely on information technology systems to keep financial records, manage our manufacturing operations, fulfill customer orders, capture laboratory data, maintain corporate records, communicate with staff and external parties and operate other critical functions. Our information technology systems are potentially vulnerable to disruption due to breakdown, malicious intrusion and computer viruses or other disruptive events, including, but not limited to, natural disasters, terrorist attacks, utility outages, theft, viruses, phishing, malware, design defects, human error and complications encountered as existing systems are maintained, repaired, replace or upgraded. If we were to experience a prolonged system disruption in our information technology systems or those of certain of our vendors, it could negatively impact our ability to serve our customers, which could adversely impact our business. Although we maintain offsite back-ups of our data, if operations at our facilities were disrupted, it may cause a material disruption in our business if we are not capable of restoring function on an acceptable time frame. In addition, our information technology systems are potentially vulnerable to data security breaches — whether by employees or others — which may expose sensitive data to unauthorized persons. Such data security breaches could lead to the loss of trade secrets or other intellectual property or could lead to the public exposure of personal information (including sensitive personal information) of our employees, customers and others, any of which could have a material adverse effect on our business, reputation, financial condition and results of operations. In addition, any such access, disclosure or other loss of information could result in legal claims or proceedings, liability under laws that protect the privacy of personal information, including state data protection regulations the E.U. GDPR and the UK GDPR, and other regulations, the violation of which could result in significant penalties. In addition, these breaches and other inappropriate access can be difficult to detect, and any delay in identifying them may lead to increased harm of the type described above.

Although we utilize various procedures and controls to mitigate our exposure to these risks, cyber attacks and other cyber events are evolving, unpredictable and increasing in sophistication. Moreover, we have no control over the information technology systems of our third-party partners, including suppliers, manufacturers, service providers and others with which our systems may connect and communicate. As a result, the occurrence of a cyber incident could go unnoticed for a period time. We have cybersecurity insurance coverage in the event we become subject to various cyber attacks, however, we cannot ensure that it will be sufficient to cover any particular losses we may experience. Any cyber incident could have a material adverse effect on our business, financial condition and results of operations.

The failure to comply with complex federal and state laws and regulations related to submission of claims for services could result in significant monetary damages and penalties and exclusion from the Medicare and Medicaid programs.

We are subject to extensive federal and state laws and regulations relating to the submission of claims for payment for services, including those that relate to coverage of services under Medicare, Medicaid, and other governmental healthcare programs, the amounts that may be billed for services, and to whom claims for services may be submitted, such as billing Medicare as the secondary, rather than the primary, payor. The failure to comply with applicable laws and regulations, for example, enrollment in the Medicare Provider Enrollment, Chain and Ownership System, could result in our inability to receive payment for our services or attempts by third-party payors, such as Medicare and Medicaid, to recover payments from us that we have already received. Submission of claims in violation of certain statutory or regulatory requirements can result in penalties, including civil money penalties of up to $10,000 for each item or service billed to Medicare in violation of the legal requirement, and exclusion from participation in Medicare and Medicaid. Government authorities may also assert that violations of laws and regulations related to submission of claims violate the federal False Claims Act or other laws related to fraud and abuse, including submission of claims for services that were not medically necessary. The Company will be generally dependent on independent physicians to determine when its services are medically necessary for a particular patient. Nevertheless, we could be adversely affected if it were determined that the services we provided were not medically necessary and not reimbursable, particularly if it were asserted that we contributed to the physician's referrals of unnecessary services. It is also possible that the government could attempt to hold us liable under fraud and abuse laws for improper claims submitted by us if it were found that we knowingly participated in the arrangement that resulted in submission of the improper claims.

In addition to the Patient Protection and Affordable Care Act ("PPACA"), the effect of which cannot presently be quantified, various healthcare reform proposals have also emerged from federal and state governments. Changes in healthcare policy could adversely affect our business.

We cannot predict whether future healthcare initiatives will be implemented at the federal or state level or in countries outside of the U.S. in which we may do business, or the effect any future legislation or regulation will have on us. The taxes imposed by any new federal legislation and the expansion in government's effect on the U.S. healthcare industry, including the Inflation Reduction Act enacted in August 2022, may result in decreased profits to us, lower reimbursements by payors for our products or reduced medical procedure volumes, all of which may adversely affect our business, financial condition and results of operations.

We face significant competition from other biotechnology and pharmaceutical companies.

Our product candidates face, and will continue to face, intense competition from large pharmaceutical and biotechnology companies, as well as academic and research institutions. We compete in an industry that is characterized by (i) rapid technological change, (ii) evolving industry standards, (iii) emerging competition and (iv) new product introductions. Our competitors have existing products that compete with our product candidates and they may develop and commercialize additional products that will compete with our product candidates. Because competing companies and institutions may have greater financial resources than us, they may be able to provide broader services and product lines, make greater investments in research and development or carry on broader R&D initiatives. Our competitors also have greater development capabilities than we do and have substantially greater experience in undertaking preclinical and clinical testing of product candidates, obtaining regulatory approvals and manufacturing and marketing pharmaceutical products.

Even if we obtain regulatory approval for our products, we may not be the first to market and that may affect the price or demand for our potential products. Existing or future competing products may provide greater therapeutic convenience or clinical or other benefits for a specific indication, or fewer side effects, than our potential products or may offer comparable performance at a lower cost. Additionally, the availability and price of our competitors' products could limit the demand and the price we are able to charge for our potential products thereby reducing or eliminating our commercial opportunity. We may not be able to implement our business plan if the acceptance of our potential products is inhibited by price competition or the reluctance of physicians to switch from existing methods of treatment to our potential products, or if physicians switch to other new products or choose to reserve our potential products. Additionally, a competitor could obtain orphan product exclusivity from the FDA with respect to such competitor's product, which may prevent us from obtaining approval from the FDA for such potential products for the same indication for a period of time. If our potential products fail to capture and maintain market share, we may not achieve sufficient product revenues and our business will suffer.

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

We are exposed to the risk of employees' or our third-party partners' fraud or other misconduct. Misconduct by our employees or partners could include intentional failures to comply with FDA regulations, provide accurate information to the FDA, comply with manufacturing standards, comply with federal and state healthcare fraud and abuse laws and regulations, report financial information or data accurately or disclose unauthorized activities to us. Employee and third-party misconduct could involve the improper use of information obtained in the course of clinical trials, which could result in regulatory sanctions and serious harm to our business and our reputation. It is not always possible to identify and deter such misconduct, and the precautions we take to detect and prevent this activity may not be effective in controlling unknown or unmanaged risks or losses or in protecting us from governmental investigations or other actions or lawsuits stemming from a failure to be in compliance with such laws or regulations. If any such actions are instituted against us and we are not successful in defending ourselves or asserting our rights, those actions could have a material adverse effect on our business, financial condition and results of operations, and result in the imposition of significant fines or other sanctions against us.

Our business involves risk associated with handling hazardous and other dangerous materials.

Our research and development activities involve the controlled use of hazardous materials, chemicals, human blood and tissue, animal blood and blood products, animal tissue, and biological waste. The risk of accidental contamination or injury from these materials cannot be completely eliminated. The failure to comply with current or future regulations could result in the imposition of substantial fines against the Company, suspension of production, alteration of our manufacturing processes or cessation of operations.

Risks Related to the Securities Markets and Investment in our Securities.

Our shares of common stock are listed on the Nasdaq Capital Market, but we cannot guarantee that we will be able to satisfy the continued listing standards going forward.

Although our shares of common stock are listed on the Nasdaq Capital Market (Nasdaq), we cannot ensure that we will be able to satisfy the continued listing standards of Nasdaq going forward, including its $1.00 minimum bid price requirement. If we cannot satisfy the continued listing standards going forward, Nasdaq may commence delisting procedures against us, which could result in our stock being removed from listing on Nasdaq. On October 5, 2022, we received a letter from Nasdaq stating we are not in compliance with Listing Rule 5550(a)(2) because our common stock failed to maintain a minimum closing bid price of $1.00 per share for 30 consecutive business days. We have until April 3, 2023, to either regain compliance, or request additional time to regain compliance.

If we are unable to regain compliance with Nasdaq Listing Rule 5550(a)(2), and if our stock price continues not to satisfy the $1.00 minimum bid price requirement or we otherwise fail to satisfy other continued listing requirements, we may be delisted from Nasdaq, which could adversely affect our stock price, liquidity, and our ability to raise funding.

The sale of a substantial number of shares of our common stock into the market may cause substantial dilution to our existing stockholders and the sale, actual or anticipated, of a substantial number of shares of common stock could cause the price of our common stock to decline.

We have offered and sold a considerable amount of our common stock in past financings. Any additional or anticipated sales of shares by us, holders of our warrants to purchase common stock or other stockholders may cause the trading price of our common stock to decline. Additional issuances of shares by us may result in dilution to the interests of other holders of our common stock. The sale of a substantial number of shares of our common stock by us, our warrant holders or other stockholders or anticipation of such sales, could make it more difficult for us to sell equity or equity-related securities in the future at a time and at a price that we might otherwise wish to effect sales.

The trading price of our common stock has been and is likely to continue to be volatile.

Our stock price is highly volatile. In addition to the factors discussed in this Annual Report, the trading price of our common stock may fluctuate significantly in response to numerous factors, many of which are beyond our control including:

- price and volume fluctuations in the overall stock market;
- changes in operating results and performance and stock market valuations of other biopharmaceutical companies generally;
- macroeconomic industry, geopolitical and market conditions, including, but not limited to, rising interest rates, the inflationary environment, recessionary fears and rising geopolitical tensions;
- financial or operational projections we may provide to the public, any changes in these projections or our failure to meet these projections;
- changes in government regulation;
- our inclusion or removal from certain stock indices;
- developments in patent or other proprietary rights;
- new products by our competitors;
- announcements of changes in our senior management or directors;
- other events, including those resulting from war, incidents of terrorism, natural disasters, pandemics, including COVID-19, or responses to these events;
- changes in accounting principles;
- results of clinical studies;
- regulatory and FDA actions, including inspections and warning letters;
- coverage of us, and changes in financial estimates by any securities analysts who follow our Company, or our failure to meet these estimates or the expectations of investors;
- any ongoing litigation that we are currently involved in or litigation that we may become involved in the future;
- additional shares of our common stock being sold into the market by us or our existing stockholders or warrant holders or the anticipation of such sales; and
- media coverage of our business and financial performance.

In addition, the stock markets have experienced extreme price and volume fluctuations that have affected and continue to affect the market prices of equity securities of many healthcare companies. Stock prices of many healthcare companies have fluctuated in a manner unrelated or disproportionate to the operating performance of those companies. As a result, an investment in our common stock may decrease in value.

The ownership of our common stock may become concentrated among a small number of stockholders, and if our principal stockholders, directors, and officers choose to act together, they may be able to significantly influence management and operations, which may prevent us from taking actions that may be favorable to stockholders.

Our ownership may become concentrated among a small number of stockholders. These stockholders, acting together, could have the ability to exert substantial influence over all matters requiring approval by our stockholders, including the election and removal of directors and any proposed merger, consolidation or sale of all or substantially all of our assets. This concentration of ownership could also have the effect of delaying, deferring, or preventing a change in control of the Company or impeding a merger or consolidation, takeover or other business combination that could be favorable to stockholders.

If we are unable to implement and maintain effective internal control over financial reporting in the future, investors may lose confidence in the accuracy and completeness of our financial reports and the trading price of our common stock may be negatively affected.

We are required to maintain internal controls over financial reporting and to report any material weaknesses in such internal controls. If we identify material weaknesses in our internal control over financial reporting, or if we are unable to comply with the requirements of the Sarbanes-Oxley Act in a timely manner or assert that our internal control over financial reporting is effective, investors may lose confidence in the accuracy and completeness of our financial reports and the trading price of our common stock could be negatively affected, and we could become subject to investigations by the stock exchange on which our securities are listed, the Securities and Exchange Commission, or other regulatory authorities, which could require additional financial and management resources.

Our Stockholder Rights Agreement, the anti-takeover provisions in our governing documents and Delaware law could delay or prevent a change in control which could reduce the market price of our common stock and could prevent or frustrate attempts by our stockholders to replace or remove our current management and the current Board of Directors.

Our Stockholder Rights Agreement, which we adopted in May 2014, our amended and restated certificate of incorporation, as amended, and our amended and restated bylaws contain provisions that could delay or prevent a change in control or changes in our Board of Directors (our Board) that our stockholders might consider favorable. These provisions include a staggered Board, which divides the Board into three classes, with directors in each class serving staggered three-year terms. The existence of a staggered board can make it more difficult for a third-party to effect a takeover of our Company if the incumbent Board does not support the transaction. These and other provisions in our corporate documents, including our Shareholder Rights Plan and Delaware law might discourage, delay or prevent a change in control or changes in our Board. These provisions could also discourage proxy contests and make it more difficult for activist investors and other stockholders to elect directors not nominated by our Board. Furthermore, the existence of these provisions, together with certain provisions of Delaware law, might hinder or delay an attempted takeover other than through negotiations with our Board.

If securities or industry analysts do not publish research or publish inaccurate or unfavorable research about our business, the price of our common stock and trading volume could decline.

The trading market for our common stock will depend in part on the research and reports that securities or industry analysts publish about us or our business. Multiple securities and industry analysts currently cover us. If one or more of the analysts downgrade our common stock or publish inaccurate or unfavorable research about our business, the price of our common stock would likely decline. If one or more of these analysts cease coverage of us or fail to publish reports on us regularly, demand for our common stock could decrease, which could cause the price of our common stock and trading volume to decline.

ITEM 1B. UNRESOLVED STAFF COMMENTS

Not applicable.

ITEM 2. PROPERTIES

As of December 31, 2022, we leased a total of approximately 202 square feet of office space in one location in Seattle, Washington, from WW 107 Spring Street LLC. We believe that our current facilities will be adequate to meet our needs for the next 12 months, and we anticipate that additional space will be available, when needed, on commercially reasonable terms. The information set forth in “PART II, ITEM 7. MANAGEMENT'S DISCUSSION AND ANALYSIS OF FINANCIAL CONDITION AND RESULTS OF OPERATIONS – Commercial Lease Agreement” is incorporated herein by reference.

ITEM 3. LEGAL PROCEEDINGS

We are not currently a party to any material legal proceedings. From time to time, we may become involved in litigation relating to claims arising from the ordinary course of business. However, we believe that there are no claims or actions pending against us currently, the ultimate disposition of which would have a material adverse effect on our consolidated results of operation, financial condition or cash flows.

ITEM 4. MINE SAFETY DISCLOSURES

Not applicable.

PART II

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

Market Information

Our common stock, par value $0.18 per share, trades on the Nasdaq Capital Market under the symbol "ATOS".

Stockholders

As of March 16, 2023, there were approximately 40 stockholders of record of our common stock, one of which is Cede & Co., a nominee for Depository Trust Company, or (DTC). All of the shares of common stock held by brokerage firms, banks and other financial institutions as nominees for beneficial owners are deposited into participant accounts at DTC and are therefore considered to be held of record by Cede & Co. as one stockholder.

Dividends

We have never declared or paid any cash dividends on our common stock and do not currently anticipate declaring or paying cash dividends on our common stock in the foreseeable future. We currently intend to retain any future earnings to finance the growth and development of our business. Any future determination relating to our dividend policy will be made at the discretion of our Board of Directors and will depend on a number of factors, including future earnings, capital requirements, financial conditions, future prospects, contractual restrictions and other factors that our Board of Directors may deem relevant.

Issuer Purchases of Securities

We did not repurchase any of our equity securities during the fourth quarter of fiscal 2022.

Unregistered Sales of Equity Securities and Use of Proceeds

None.

ITEM 6. RESERVED

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

Overview

The following discussion of the financial condition and results of operations should be read in conjunction with the consolidated financial statements and the related notes included elsewhere in this Annual Report. This discussion contains forward-looking statements, which are based on assumptions about the future of the Company's business. Actual results and outcomes could differ materially from those contained in the forward-looking statements. Please read "Forward-Looking Statements" included elsewhere in this Annual Report for additional information regarding forward-looking statements.

Company Overview

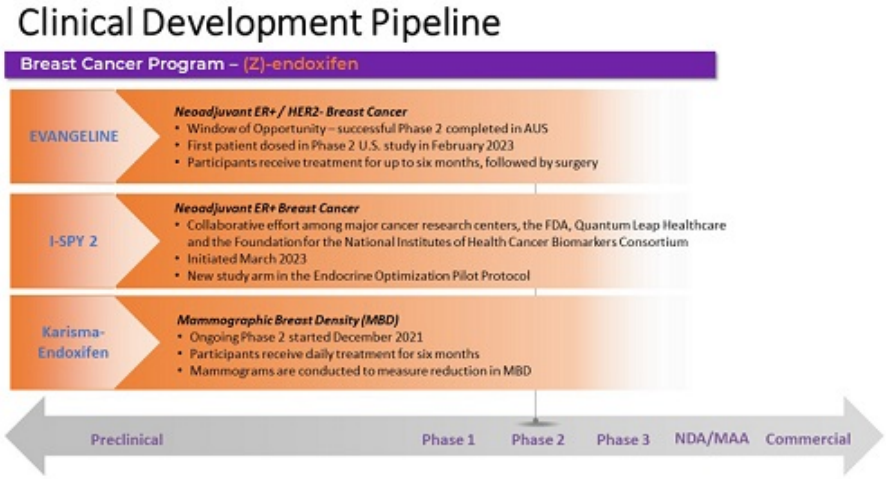
We are a clinical-stage biopharmaceutical company developing proprietary innovative medicines in areas of significant unmet medical need in oncology, with a current focus on breast cancer and other breast conditions. Our lead drug candidate under development is oral (Z)-endoxifen which we are developing in two settings: one to treat breast cancer by reducing tumor cell activity prior to surgery and another to reduce dense breast tissue in women. More than ten million women in the U.S. and millions more worldwide have high breast density, which reduces the ability of mammograms to detect cancer and increases the risk of breast cancer. There is no FDA-approved treatment for breast density. We believe there is also a significant unmet need for breast cancer treatments in premenopausal women prior to surgery as the typical treatment for the majority of early-stage breast cancer patients currently involves ovarian suppression, which can induce premature menopause and dramatically impact a patient's quality of life.

We have been granted two U.S. patents covering our proprietary (Z)-endoxifen and we have numerous applications pending in the U.S. and in other major countries.

Our business strategy is to advance our programs through clinical studies, including with partners, and opportunistically add programs in areas of high unmet medical need through acquisition, minority investment, collaboration, or internal development.

Summary of Our Leading Programs

The following is a summary of the status of our major clinical development programs as of the date of this Annual Report:



(Z)-endoxifen. *(Z)-*endoxifen is an active metabolite of tamoxifen, which is an FDA-approved drug to treat and prevent breast cancer in high-risk women. We are developing a proprietary form of (Z)-endoxifen which is administered orally for the potential treatment of breast cancer and reduction of breast density. We have completed four Phase 1 clinical studies (including a study in men) and two Phase 2 clinical studies with our proprietary (Z)-endoxifen (including oral and topical formulations). We have also completed significant pre-clinical development and have developed clinical manufacturing capabilities through qualified third-parties.

(Z)-endoxifen for Women with Measurable Breast Density. Mammographic breast density (MBD) is an emerging public health issue affecting over ten million women in the U.S. alone. Studies conducted by others have shown that MBD increases the risk of developing breast cancer and that reducing MBD may reduce the incidence of breast cancer.

In December 2021, we commenced a Phase 2 study of our proprietary oral (Z)-endoxifen. The study, known as the Karisma-(Z)-endoxifen study, is a Phase 2, randomized, double-blind, placebo-controlled, dose-response study of our proprietary oral (Z)-endoxifen in healthy premenopausal women with measurable breast density. The primary objective of the study is to determine the dose-response relationship of daily (Z)-endoxifen on breast density reduction. Secondary endpoints will assess safety and tolerability. The study also includes an exploratory endpoint to assess durability of the breast density changes. The study is being conducted in Stockholm, Sweden and will include approximately 240 participants, at full enrollment, who will receive daily doses of oral (Z)-endoxifen or placebo for six months after they enroll.

Based on input from the FDA and Swedish Medical Products Agency, reduction in MBD may not be an approvable indication unless we can demonstrate that our (Z)-endoxifen also reduces the incidence of breast cancer. We may therefore conduct additional studies of (Z)-endoxifen to assess its correlation with the risk of breast cancer and/or reduction in the incidence of new breast cancers.

(Z)-endoxifen for Neoadjuvant Treatment of Breast Cancer. We are also developing (Z)-endoxifen to treat estrogen receptor positive (ER+) / human epidermal growth factor receptor 2 negative (HER2-) breast cancer in the neoadjuvant setting, which is the administration of a therapy before surgical treatment. Although there are neoadjuvant treatments for breast cancers that are not ER+, there are few neoadjuvant treatments for ER+ breast cancer which comprises about 78% of all breast cancers and the treatments that are available typically involve ovarian suppression which can induce premature menopause and significantly impact quality of life. We believe there is a compelling need for therapy with our (Z)-endoxifen in this setting.

In October 2022, we received authorization from the U.S. FDA for our Investigational New Drug (IND) application for oral (Z)-endoxifen. The study, “A Randomized Phase 2 Noninferiority Trial of (Z)-endoxifen and Exemestane + Goserelin as Neoadjuvant Treatment in Premenopausal Women with ER+/HER2- Breast Cancer,” also known as “EVANGELINE,” is an open-label, randomized, Phase 2 study designed to investigate (Z)-endoxifen for the neoadjuvant treatment of premenopausal women ages 18 and older with early stage (Grade 1 or 2) ER+/HER2- breast cancer. In February 2023, we enrolled the first patient in this study.

Inhaled HNAC (AT-H201). AT-H201 was under development as a potential treatment for COVID-19; however, due to the rapidly shifting treatment landscape and introduction of effective vaccines and treatments, in late 2022 we shifted our focus to the treatment of patients with compromised lung function due to the damaging effects of cancer treatment. We are scheduled to conclude our study in healthy volunteers with AT-H201 in early 2023, but we do not expect to advance the program further in 2023 as we focus on our (Z)-endoxifen programs.

Recent Investment in CAR-T Company

On December 23, 2022, we closed our previously announced investment in Dynamic Cell Therapies, Inc. (DCT), a privately-held, venture capital-backed, developer of CAR-T therapies. DCT is in the pre-clinical phase of developing controllable CAR-T cells to address difficult-to-treat cancers. Its platform technology of dynamic control of engineered T-cells is designed to improve the safety, efficacy, and durability of CAR-T cell therapies. While its initial focus is hematologic malignancies, it's possible that its innovative approach could also have broad applicability in solid tumors and autoimmune diseases. Atossa’s investment in DCT, which totaled $4.7 million, resulted in Atossa owning approximately 19% of the outstanding capital stock of DCT as of December 31, 2022.

Impact of the Ongoing Coronavirus Pandemic

The ongoing COVID-19 pandemic may affect our operations and those of third-parties on which we rely, including causing possible disruptions in the supply of (Z)-endoxifen, the pace of enrollment in our clinical trials and the conduct of current and future clinical trials. In addition, the COVID-19 pandemic may affect the operations of the U.S. FDA and other health authorities including similar entities/agencies in Sweden and Australia, which could result in delays in meetings, reviews and approvals. As the COVID-19 pandemic reaches endemic stages, the extent to which it may continue to impact our operations, including COVID-19-related delays or other impacts on our business, financing or clinical trial activities or on healthcare systems or the global economy as a whole, remains highly uncertain and difficult to predict; however, as of March 16, 2023, we have not experienced a significant delay in the enrollment or the drug supply for our ongoing and planned clinical studies, including studies of (Z)-endoxifen.

Research and Development Phase

We are in the research and development phase and are not currently marketing any products. We do not anticipate generating revenue unless and until we develop and launch our pharmaceutical programs.

Commercial Lease Agreement

On March 1, 2021, the Company entered into an operating lease with WW 107 Spring Street LLC to lease office space at 107 Spring Street, Seattle Washington. The Company agreed to pay $750 in monthly rent for an initial term of 12 months. On March 1, 2022, the Company entered into an operating lease for the same space to pay $1,000 monthly rent for a new term of 12 months.

Critical Accounting Policies and Significant Estimates

Our management's discussion and analysis of our 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, (U.S. GAAP). The preparation of these consolidated financial statements requires us to make estimates and judgments that affect the reported amounts of assets, liabilities and expenses. We base our estimates on our historical experience, known trends and events, and on various other factors that we believe to be reasonable under the circumstances, the results of which form the basis for making judgments about the carrying values of assets and liabilities that are not readily apparent from other sources. Our actual results may differ from these estimates under different assumptions or conditions.

While our significant accounting policies are more fully described in Note 3 to our consolidated financial statements included in this Annual Report, we believe that the following accounting policies are the most critical to the judgments and estimates used in the preparation of our consolidated financial statements.

Investments in Equity Securities

Our investment in DCT Series Seed Preferred Stock does not have a readily determinable fair value, so we have elected to measure the investment at cost less any impairment. As part of preparing our consolidated financial statements we considered qualitative impairment factors in determining if an impairment analysis is required. Specifically, the Company considered the adverse change in the general market condition of the industry in which DCT operates and concerns about the investee's ability to continue as a going concern, due to negative cash flows from operations. Based on these impairment indicators, we performed a fair value measurement using a Black-Scholes options pricing model. The model requires assumptions regarding the expected average volatility of comparable companies, the expected term of our investment, and an estimation of an appropriate risk-free interest rate over the term of our investment. The expected stock price volatility assumption is based upon the average historic volatility of eighteen comparable public clinical stage immunotherapy or CAR-T companies. The expected term of our investment is four years. The risk-free interest rate used is based upon prevailing short-term interest rates over the expected term of the investment.

The resulting valuation concluded that the investment was not impaired, thus, no impairment has been recorded. The assumptions and estimates used to estimate the fair value of the investment include the following information from DCT:

- Unaudited financial statements;
- Projected technological developments of DCT;
- Current fundraising transactions;
- Current ability of DCT to raise additional financing when needed;
- Changes in the economic environment which may have a material impact on the operating results of DCT, and;
- Timing of a deemed liquidation event occurring.

While assumptions used to calculate and account for the investment in non-marketable equity securities represent management's best estimates, these estimates involve inherent uncertainties and the application of management's judgement. As a result, if underlying assumptions and estimates change, our investment may be impaired in future periods.

Research and Development Expenses

As part of the process of preparing our consolidated financial statements, we are required to estimate our accrued research and development expenses. This process involves reviewing open contracts and work orders, communicating with our applicable personnel to identify services that have been performed on our behalf, and estimating the associated cost incurred for the services, including, in some cases, when we have not yet been invoiced or otherwise notified of actual costs. R&D costs are generally expensed as incurred. R&D expenses include, for example, manufacturing expense for our drugs under development, expenses associated with preclinical studies, clinical trials and associated salaries, bonuses, stock-based compensation and benefits. R&D expenses also include an allocation of the CEO's salary and related benefits including bonus and non-cash stock-based compensation expense based on an estimate of his total hours expended on research and development activities.

We have entered into various research and development contracts with research institutions, CRO, clinical manufacturing organizations (CMOs) and other companies. The majority of our service providers invoice us monthly for services performed, however, payments under some of these contracts may be required in advance of the services being performed, for example when a contract requires an initial payment at the outset of the contract. Payments made in advance of performance of services are reflected in the accompanying consolidated balance sheets as prepaid expenses.

We base our expenses related to preclinical studies and clinical trials on our estimates of the services received and efforts expended pursuant to quotes and contracts with CROs and other companies that conduct and manage preclinical studies and clinical trials on our behalf. The financial terms of these vary from contract to contract and may result in uneven payment flows. There may be instances in which payments made to our vendors will exceed the level of services provided and result in a prepayment of the expense. In accruing service fees, we estimate the time period over which services will be performed and the level of effort to be expended in each period. If the actual timing of the performance of services or the level of effort varies from the estimate, we adjust the accrual or prepaid expense accordingly. We make estimates of our accrued expenses as of each balance sheet date in the consolidated financial statements based on facts and circumstances known to us at that time. However, additional information may become available to us, which may allow us to make a more accurate estimate in future periods. If we do not identify costs that we have begun to incur or if we underestimate or overestimate the level of services performed or the costs of these services, our actual expenses could differ from our estimates.

Stock-Based Payments

We measure all stock option awards granted to employees, non-employee directors and consultants based on the fair value on the date of grant, and we recognize compensation expense over the requisite service period, which is generally the vesting period of the respective award. The straight-line method of expense recognition is applied to all awards with service-only conditions. We account for forfeitures as they occur.

The fair value of each option grant is estimated using the Black-Scholes option-pricing model, which requires assumptions regarding the expected volatility of the price of our common stock, the expected life of the options, an expectation regarding future dividends on our common stock, estimation of an appropriate risk-free interest rate and expected term. Our expected common stock price volatility assumption is based upon the historic volatility of our stock price. The expected life assumption for stock option grants is based on an average of the contractual term of the options of ten years with the average vesting term of one to four years. The dividend yield assumption of zero is based upon the fact that we have never paid cash dividends and presently have no intention of paying cash dividends in the future. The risk-free interest rate used for each grant is based upon prevailing short-term interest rates over the expected lives of the options.

While assumptions used to calculate and account for stock-based compensation awards represent management's best estimates, these estimates involve inherent uncertainties and the application of management's judgement. As a result, if revisions are made to our underlying assumptions and estimates, our stock-based compensation expense could vary significantly from period to period.

Results of Operations

Comparison of Years Ended December 31, 2022 and 2021 (*dollar amounts in thousands unless otherwise noted*)

Revenue and Cost of Revenue:

For the years ended December 31, 2022 and 2021, we have no source of sustainable revenue and no associated cost of revenue.

Operating Expenses:

The following table provides a breakdown of major categories within Research and Development (R&D) and General and Administrative (G&A) expenses for the years ended December 31, 2022 and 2021, together with the dollar change in those categories:

		2022	2021	Period-Period Change
Research and Development				
	Clinical trials	$ 10,225	$ 4,656	$ 5,569
	Compensation	1,875	1,482	393
	Stock-based compensation	2,393	1,591	802
	Professional fees	1,242	454	788
	Exclusivity agreements	(700)	1,000	(1,700)
	Other	48	27	21
	Research and Development Total	$ 15,083	$ 9,210	$ 5,873
General and Administrative				
	Compensation	$ 3,034	$ 2,371	$ 663
	Stock-based compensation	4,395	3,676	719
	Professional fees	1,625	2,317	(692)
	Legal	1,135	534	601
	Insurance	1,640	1,576	64
	Other	779	837	(58)
	General and Administrative Total	$ 12,608	$ 11,311	$ 1,297

Total operating expenses were $27,691 for the year ended December 31, 2022, which was an increase of $7,170, or 35% from the year ended December 31, 2021. Operating expenses for 2022 consisted of R&D expenses of $15,083 and G&A expenses of $12,608. Operating expenses for 2021 consisted of R&D expenses of $9,210 and G&A expenses of $11,311. Factors contributing to the increased operating expenses in the year ended December 31, 2022 are explained below.

R&D Expenses: R&D expenses for the year ended December 31, 2022, were $15,083, an increase of $5,873 or 64% from total R&D expenses for the year ended December 31, 2021 of $9,210. Key changes were as follows:

• The increase in R&D expense was attributed primarily to increased spending on clinical and non-clinical trials of $5,569 compared to the prior year period due to additional pre-clinical toxicology studies in our (Z)-endoxifen and AT-H201 programs as well as increased trial costs and manufacturing expenses for (Z)-endoxifen.

• R&D compensation increased $393 in 2022 compared to the prior year period due to increased headcount, salary, bonuses and benefits during 2022.

• Stock-based compensation, which is a non-cash charge, increased $802 due to the increased number of options being expensed as well as the weighted average fair value of options amortizing in 2022 was higher compared to the prior year period.

• Professional fees increased $788 compared to the prior year period, due primarily to a CAR-T technology market analysis performed during 2022.

• In 2022, the Company received a refund of $1,000 from the research institution with which the Company had an exclusive right to negotiate for the acquisition of the worldwide rights to two oncology R&D programs. In 2021, R&D expenses included $1,000 attributable to the same one-time exclusivity fee. Finally, in 2022, we paid $300 for the exclusive right to negotiate with another CAR-T Company. Net, the exclusivity agreements caused a decrease in expenses of $1,700 compared to the prior year period.

G&A Expenses: G&A expenses were $12,608 for the year ended December 31, 2022, an increase of $1,297, or 11% from total G&A expenses for the year ended December 31, 2021 of $11,311. Key changes were as follows:

• The increase in G&A expense for the year ended December 31, 2022 compared to the prior year period, was in part attributable to the increase in compensation expense of $663 in 2022 due to an increase in headcount, hourly wages, salaries and bonus accruals.

• Non-cash stock-based compensation expense also increased by $719 due to the increased number of options being expensed as well as the weighted average fair value of options amortizing in 2022 was higher compared to the prior year period.

• Professional fees decreased by $692 in 2022 compared to the prior year period, due primarily to a decrease in proxy costs for investor outreach.

• Legal fees increased $601 in 2022 compared to the prior year period, due to higher patent activity in 2022 for (Z)-endoxifen and our immunotherapy research.

Interest Income: Interest income was $877 for the year ended December 31, 2022 compared to the prior year period of $6. The increase is due to the investment of an additional $50,000 in a money market account during 2022 and higher average interest rates for the year ended December 31, 2022 compared to 2021.

Income Taxes: We have incurred net operating losses since inception; we did not record an income tax benefit for our incurred losses for the years ended December 31, 2022 and 2021, due to uncertainty regarding utilization of our net operating loss carryforwards and due to our history of losses.

Liquidity and Capital Resources

The Company has incurred net losses and negative operating cash flows since inception. For the year ended December 31, 2022, the Company recorded a net loss of $26,960 and used $20,760 of cash in operating activities. As of December 31, 2022, the Company had $110,890 in unrestricted cash and cash equivalents and working capital of $112,629. We believe we have sufficient cash to fund our projected operating requirements for at least the next 12 months. Refer to Note 10 of our consolidated financial statements included in this Annual Report for a discussion of our 2021 financing transactions.

Cash Flows

As of December 31, 2022, we had cash, cash equivalents and restricted cash of $111,000.

Net Cash Flows from Operating Activities: Net cash used in operating activities was $20,760 for the year ended December 31, 2022, an increase of $4,288, or 26%, compared to net cash used in operating activities for the year ended December 31, 2021 of $16,472. The increase in 2022 compared to the prior year period was primarily due to an increase in clinical trial activity of $5,569. This was partially offset by the net impact of several exclusivity agreements, which resulted in a net decrease in cash used of $1,700.

Net Cash Flows from Investing Activities: Net cash used in investing activities was $4,727 for the year ended December 31, 2022, an increase of $4,718 compared to net cash used in investing activities of $9 for the year ended December 31, 2021. The increase was primarily due to our investment in the equity securities of DCT for $4,700.

Net Cash Flows from Financing Activities: There were no financing activities during the year ended December 31, 2022. Net cash provided by financing activities was $113,304 for the year ended December 31, 2021. During the year ended December 31, 2021, we sold common stock and warrants for net proceeds of $69,668 and received proceeds of $43,818 from the exercise of warrants. In addition, we received $391 from proceeds from employee stock options and paid $573 related to taxes on the net-exercise of employee stock options.

Funding Requirements

We expect to incur ongoing operating losses for the foreseeable future as we continue to develop our planned therapeutic programs including related clinical studies and other programs in the pipeline. Our future funding requirements will depend on many factors, including:

- the cost of manufacturing drugs under development, the costs associated with clinical trials and associated salaries and benefits;
- the extent to which we enter into contracts or invest in third parties in order to further develop our drug candidates;
- the costs of preparing, filing and prosecuting patent applications, maintaining and enforcing our intellectual property rights and defending other intellectual property-related claims;
- the costs and fees associated with the discovery, acquisition or in-license of additional product candidates or technologies;

If we are unable to raise additional capital when needed, however, we could be forced to curtail or cease our operations. Our future capital uses and requirements will depend on the time and expenses needed to begin and continue clinical trials for our new drug developments. As mentioned earlier, the coronavirus pandemic could adversely impact the timing and enrollment of our clinical trials.

Additional funding may not be available to us on acceptable terms or at all. The continued coronavirus pandemic and uncertain market and macroeconomic conditions may limit our ability to access capital. In addition, the terms of any financing may adversely affect the holdings or the rights of our stockholders. For example, we may raise additional funds by issuing equity securities or by equity offerings, collaboration agreements, debt financings or licensing arrangements.

If adequate funds are not available, we may be required to terminate, significantly modify or delay our development programs, reduce our planned commercialization efforts, or obtain funds through collaborators that may require us to relinquish rights to our technologies or product candidates that we might otherwise seek to develop or commercialize independently. Further, we may elect to raise additional funds even before we need them if we believe the conditions for raising capital are favorable.

Although we submitted a proposal to our stockholders to amend our amended and restated certificate of incorporation, as amended, to add additional authorized shares of our common stock for various potential purposes, including potential capital raising transactions, our stockholders did not approve the proposal at our 2021 and 2022 annual stockholders' meetings nor did they approve it at a special meeting of stockholders in September 2021. A lack of authorized shares may limit our ability to raise capital when needed.

We may not be able to satisfy the continued listing standards of The Nasdaq Capital Market (the Nasdaq) going forward, including its $1.00 minimum bid price requirement. If we cannot satisfy the continued listing standards of Nasdaq going forward, Nasdaq may commence delisting procedures against us, which could result in our common stock being removed from listing on Nasdaq. On October 5, 2022, we received a letter from Nasdaq stating that we were not in compliance with Listing Rule 5550(a)(2) because our common stock failed to maintain a minimum closing bid price of $1.00 per share for 30 consecutive business days. We have until April 3, 2023, to either regain compliance, or request additional time to regain compliance.

If we are unable to regain compliance with Nasdaq Listing Rule 5550(a)(2), and if our stock price continues to trade below the $1.00 minimum bid price requirement, or if we otherwise fail to satisfy other continued listing requirements, we may be delisted from Nasdaq, which could adversely affect our stock price, liquidity, and our ability to raise funding.

Off-Balance Sheet Arrangements

We do not currently have, nor have we ever had, any relationships with unconsolidated entities or financial partnerships, such as entities often referred to as structured finance or special purpose entities, established for the purpose of facilitating off-balance sheet arrangements or other contractually narrow or limited purposes. In addition, we do not engage in trading activities involving non-exchange traded contracts.

Recently Adopted Accounting Pronouncements

Refer to Note 3 to our consolidated financial statements included in this Annual Report for recently adopted accounting pronouncements.

ITEM 7A. QUANTITATIVE AND QUALITATIVE DISCLOSURES ABOUT MARKET RISK

As a smaller reporting company, we are not required to provide the information requested by this item pursuant to Item 305(e) of Regulation S-K.

ITEM 8. FINANCIAL STATEMENTS AND SUPPLEMENTARY DATA

The financial statements required by this item are set forth beginning on page 42 of this Annual report and are incorporated herein by reference.

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

None.

ITEM 9A. CONTROLS AND PROCEDURES

Evaluation of Disclosure Controls and Procedures

Our management, with the participation of our Chief Executive Officer and Chief Financial Officer, conducted an evaluation of the effectiveness of our disclosure controls and procedures as of December 31, 2022, pursuant to Rules 13a-15(e) and 15d-15(e) under the Securities Exchange Act of 1934, as amended (the Exchange Act).

Our disclosure controls and procedures are designed to ensure that information required to be disclosed in our reports that are filed or furnished under the Exchange Act are recorded, processed, summarized and reported within the time periods specified in the rules and forms of the SEC. Disclosure controls and procedures include, without limitation, controls and procedures designed to ensure that information required to be disclosed in our Company's reports filed or furnished under the Exchange Act is accumulated and communicated to the Company's management, including our Chief Executive Officer and Chief Financial Officer, as appropriate, to allow timely decisions regarding required disclosure. Management recognizes that any controls and procedures, no matter how well designed and operated, can provide only reasonable assurance of achieving their objectives, and management necessarily applies its judgment in evaluating the cost-benefit relationship of possible controls and procedures.

Based on the evaluation of our disclosure controls and procedures as of December 31, 2022, our Chief Executive Officer and Chief Financial Officer concluded that, as of such date, our disclosure controls and procedures were effective at the reasonable assurance level.

Management's Annual Report on Internal Controls

Our management is responsible for establishing and maintaining adequate internal control over financial reporting (pursuant to Rules 13a-15(f) and 15d-15(f) under the Exchange Act). Our internal control over financial reporting includes policies and procedures designed to provide reasonable assurance regarding the reliability of financial reporting and the preparation of financial statements for external reporting purposes in accordance with generally accepted accounting principles.

Under the supervision and with the participation of our management, including our Chief Executive Officer and Chief Financial Officer, we conducted an evaluation of the effectiveness of our internal control over financial reporting as of December 31, 2022, based on the Framework in Internal Control—Integrated Framework (2013) issued by the Committee of Sponsoring Organizations of the Treadway Commission. Based on our evaluation under this framework, our management concluded that our internal control over financial reporting was effective as of December 31, 2022. Because we are a smaller reporting company, BDO USA LLP, our independent registered public accounting firm, is not required to attest to or issue a report on the effectiveness of our internal control over financial reporting.

Changes in Internal Control Over Financial Reporting

There have been no changes in our internal control over financial reporting (as defined in Rules 13a-15(f) and 15d-15(f) of the Exchange Act) during quarter ended December 31, 2022, 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

Information regarding our executive officers is set forth in Part I, Item 1 of this Annual Report under the caption "Information about our Executive Officers."

Except as indicated below, the other information required by this item is incorporated herein by reference to the sections entitled "Proposal No. 1 — Election of Directors," "Delinquent Section 16(a) Reports," as applicable, and "Board Committees" in our definitive Proxy Statement for our 2023 Annual Meeting of Stockholders to be held on May 4, 2023 (the Proxy Statement).

We have adopted a Code of Business Conduct and Ethics (the "Code of Conduct") that applies to all of our directors, officers and employees, including our principal executive, principal financial and principal accounting officers, or persons performing similar functions. Our Code of Conduct is posted on our website located at *https://atossatherapeutics.com/investors/* under "Governance." We intend to disclose future amendments to certain provisions of the Code of Conduct, and waivers of the Code of Conduct granted to executive officers and directors, on the website within four business days following the date of the amendment or waiver.

ITEM 11. EXECUTIVE COMPENSATION

The information required by this item is incorporated by reference to the sections entitled "Executive Compensation," in our Proxy Statement.

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

The information required by this item is incorporated by reference to the sections entitled "Executive Compensation- Equity Compensation Plan Information" and "Beneficial Owners and Management" in our Proxy Statement.

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

The information required by this item is incorporated by reference to the section entitled "Certain Relationships and Related Party Transactions" and "Corporate Governance" in our Proxy Statement.

ITEM 14. PRINCIPAL ACCOUNTANT FEES AND SERVICES

The information required by this item is incorporated by reference to the sections entitled "Proposal No. 2 — Ratification of Selection of Independent Registered Public Accounting Firm" in our Proxy Statement.

PART IV

ITEM 15. EXHIBITS AND FINANCIAL STATEMENT SCHEDULES

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

1. Financial Statements

2. Financial Statement Schedules

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

3. Exhibits

See the Exhibit Index set forth on page 57 of this report.

ITEM 16. FORM 10-K SUMMARY

None.

ATOSSA THERAPEUTICS, INC.

INDEX TO CONSOLIDATED FINANCIAL STATEMENTS

Audited Consolidated Financial Statements:

REPORT OF INDEPENDENT REGISTERED PUBLIC ACCOUNTING FIRM

Report of Independent Registered Public Accounting Firm

Shareholders and Board of Directors
Atossa Therapeutics, Inc.
Seattle, Washington

Opinion on the Consolidated Financial Statements

We have audited the accompanying consolidated balance sheets of Atossa Therapeutics, Inc. (the "Company") as of December 31, 2022 and 2021, the related consolidated statements of operations, stockholders' equity, and cash flows for each of the years then ended, and the related notes (collectively referred to as the "consolidated financial statements"). In our opinion, the consolidated financial statements present fairly, in all material respects, the financial position of the Company at December 31, 2022 and 2021, and the results of its operations and its cash flows for the years then ended**,** in conformity with accounting principles generally accepted in the United States of America.

Basis for Opinion

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

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

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

Critical Audit Matter

The critical audit matter communicated below is a matter arising from the current period audit of the consolidated 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 consolidated financial statements and (2) involved our especially challenging, subjective, or complex judgments. The communication of 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 separate opinions on the critical audit matter or on the accounts or disclosures to which it relates.

Accounting Treatment of the Investment in Equity Securities

As described in Note 4 to the consolidated financial statements, the Company holds an investment in equity securities that has a balance of $4,700,000 at December 31, 2022. This investment was acquired during the year through an initial deposit of $2,700,000 on July 2, 2022 and a final payment of $2,000,000 on December 23, 2022.

We identified the accounting treatment of the investment in equity securities as a critical audit matter. The principal considerations that led to our determination are certain complexities within accounting principles generally accepted in the United States of America when determining the accounting treatment of the initial deposit and the final investment. Auditing these elements involved complexities due to the nature and extent of audit effort required to address these matters.

The primary procedures we performed to address this critical audit matter included:

- Assessing the terms of the agreement to determine if the initial deposit (i) constitutes a purchased call option and (ii) meets the definition of a derivative.

- Assessing the terms of the agreement to determine if the final investment is accounted for as (i) a debt or equity security, (ii) a variable interest entity requiring consolidation, or (iii) an equity method investment.

/s/ BDO USA, LLP

We have served as the Company's auditor since 2014.

Seattle, Washington
March 22, 2023

ATOSSA THERAPEUTICS, INC.
CONSOLIDATED BALANCE SHEETS
(amounts in thousands, except for par value)

	As of December 31,	
	2022	**2021**
Assets		
Current assets		
Cash and cash equivalents	$ 110,890	$ 136,377
Restricted cash	110	110
Prepaid expenses	4,031	2,488
Research and development tax rebate receivable	743	1,072
Other current assets	2,423	1,193
Total current assets	118,197	141,240
Investment in equity securities	4,700	-
Other assets	635	22
Total Assets	$ 123,532	$ 141,262
Liabilities and Stockholders' Equity		
Current liabilities		
Accounts payable	$ 2,965	$ 1,717
Accrued expenses	1,059	204
Payroll liabilities	1,525	1,184
Other current liabilities	19	21
Total current liabilities	5,568	3,126
Total Liabilities	5,568	3,126
Commitments and contingencies (Note 14)		
Stockholders' equity		
Series B convertible preferred stock - $0.001 par value; 10,000 shares authorized; 1 shares issued and outstanding as of December 31, 2022 and December 31, 2021	-	-
Additional paid-in capital - Series B convertible preferred stock	582	582
Common stock - $0.18 par value; 175,000 shares authorized; 126,624 shares issued and outstanding as of December 31, 2022 and December 31, 2021	22,792	22,792
Additional paid-in capital - common stock	250,784	243,996
Accumulated deficit	(156,194)	(129,234)
Total Stockholders' Equity	117,964	138,136
Total Liabilities and Stockholders' Equity	$ 123,532	$ 141,262

The accompanying notes are an integral part of these consolidated financial statements.

ATOSSA THERAPEUTICS, INC.
CONSOLIDATED STATEMENTS OF OPERATIONS
(amounts in thousands, except for per share amounts)

	For the Year Ended December 31,	
	2022	**2021**
Operating expenses		
Research and development	$ 15,083	$ 9,210
General and administrative	12,608	11,311
Total operating expenses	27,691	20,521
Operating loss	(27,691)	(20,521)
Interest income	877	6
Other expense, net	(146)	(91)
Loss before income taxes	(26,960)	(20,606)
Income taxes	-	-
Net loss	(26,960)	(20,606)
Loss per share of common stock - basic and diluted	$ (0.21)	$ (0.18)
Weighted average shares outstanding - basic and diluted	126,624	116,950

The accompanying notes are an integral part of these consolidated financial statements.

ATOSSA THERAPEUTICS, INC.
CONSOLIDATED STATEMENTS OF STOCKHOLDERS' EQUITY
(amounts in thousands)

	Series B Convertible Preferred Stock			Common Stock				
	Shares	Amount	Additional Paid-in Capital	Shares	Amount	Additional Paid-in Capital	Accumulated Deficit	Total Stockholders' Equity
Balance at December 31, 2020	1	$ -	$ 621	47,550	$ 8,559	$ 129,887	$ (111,899)	$ 27,168
Cumulative effect of adopted accounting standard	-	-	-	-	-	9,732	3,271	13,003
Issuance of common stock and warrants, net of issuance costs of $5,493	-	-	-	41,211	7,418	62,250	-	69,668
Issuance of common stock upon warrant exercise	-	-	-	37,451	6,741	37,077	-	43,818
Conversion of Series B convertible preferred stock to common stock	-	-	(39)	11	2	37	-	-
Common stock issued for option exercises	-	-	-	699	126	1,598	-	1,724
Shares withheld related to cashless exercise of options and taxes	-	-	-	(298)	(54)	(1,852)	-	(1,906)
Compensation cost for stock options granted	-	-	-	-	-	5,267	-	5,267
Net loss	-	-	-	-	-	-	(20,606)	(20,606)
Balance at December 31, 2021	1	$ -	$ 582	126,624	$ 22,792	$ 243,996	$ (129,234)	$ 138,136
Compensation cost for stock options granted	-	-	-	-	-	6,788	-	6,788
Net loss	-	-	-	-	-	-	(26,960)	(26,960)
Balance at December 31, 2022	1	$ -	$ 582	126,624	$ 22,792	$ 250,784	$ (156,194)	$ 117,964

The accompanying notes are an integral part of these consolidated financial statements.

ATOSSA THERAPEUTICS, INC.
CONSOLIDATED STATEMENTS OF CASH FLOWS
(amounts in thousands)

	For the Year Ended December 31,	
	2022	**2021**
CASH FLOWS FROM OPERATING ACTIVITIES		
Net loss	$ (26,960)	$ (20,606)
Adjustments to reconcile net loss to net cash used in operating activities		
Compensation cost for stock options granted	6,788	5,267
Depreciation and amortization	8	23
Disposal of assets	3	-
Changes in operating assets and liabilities:		
Prepaid expenses	(1,543)	(674)
Research and development tax rebate receivable	329	(437)
Other current assets	(1,230)	(521)
Other assets	(597)	-
Accounts payable	1,248	128
Accrued expenses	855	111
Payroll liabilities	341	220
Other current liabilities	(2)	17
Net cash used in operating activities	(20,760)	(16,472)
CASH FLOWS FROM INVESTING ACTIVITIES		
Purchase of investment in equity securities	(4,700)	-
Purchase of furniture and equipment	(27)	(9)
Net cash used in investing activities	(4,727)	(9)
CASH FLOWS FROM FINANCING ACTIVITIES		
Proceeds from issuance of common stock and warrants, net of issuance costs	-	69,668
Proceeds from exercise of warrants	-	43,818
Proceeds from exercise of employee stock options	-	391
Payment of taxes related to net-exercise of employee stock options	-	(573)
Net cash provided by financing activities	-	113,304
NET (DECREASE) INCREASE IN CASH, CASH EQUIVALENTS AND RESTRICTED CASH	(25,487)	96,823
CASH, CASH EQUIVALENTS AND RESTRICTED CASH, BEGINNING BALANCE	136,487	39,664
CASH, CASH EQUIVALENTS AND RESTRICTED CASH, ENDING BALANCE	$ 111,000	$ 136,487
SUPPLEMENTAL DISCLOSURES		
Reconciliation of cash, cash equivalents and restricted cash		
Cash and cash equivalents	$ 110,890	$ 136,377
Restricted cash	110	110
Total cash, cash equivalents and restricted cash shown in the consolidated statements of cash flows	$ 111,000	$ 136,487
NONCASH INVESTING AND FINANCING ACTIVITIES		
Reclassification of the warrant liability to equity upon adoption of accounting standard	$ -	$ 13,003
Common stock issued upon cashless exercise of stock options	$ -	$ 1,333
Conversion of Series B convertible preferred stock to common stock	$ -	$ 39

The accompanying notes are an integral part of these consolidated financial statements.

NOTE 1: NATURE OF OPERATIONS

Atossa Therapeutics, Inc. (the Company) was incorporated on April 30, 2009, in the State of Delaware to develop and market medical devices, laboratory tests and therapeutics to address breast health conditions. The Company is currently focused on developing proprietary innovative medicines in areas of significant unmet medical need in oncology, with a current focus on breast cancer and other breast conditions. The Company's fiscal year ends on December 31.

Impact of the Ongoing Coronavirus Pandemic

The ongoing COVID-19 pandemic may affect the Company's operations and those of third-parties on which the Company relies, including causing possible disruptions in the supply of the Company's (Z)-endoxifen, AT-H201 and the pace of enrollment in the Company's clinical trials. In addition, the COVID-19 pandemic may affect the operations of the U.S. FDA and other health authorities, including similar entities/agencies in Sweden and Australia, which could result in delays in meetings, reviews and approvals. As the COVID-19 pandemic reaches endemic stages, the extent to which it may continue to impact the Company's operations, including COVID-19-related delays or other impacts on the Company's business, financing or clinical trial activities or on healthcare systems or the global economy as a whole, remains highly uncertain and difficult to predict; however, the Company has not experienced a significant delay in the enrollment or the drug supply for its ongoing and planned clinical studies, including studies of (Z)-endoxifen and AT-H201.

NOTE 2: LIQUIDITY AND CAPITAL RESOURCES

The Company has incurred net losses and negative operating cash flows since inception. For the year ended December 31, 2022, the Company recorded a net loss of $26,960 and used $20,760 of cash in operating activities. As of December 31, 2022, the Company had $110,890 in cash and cash equivalents and working capital of $112,629. The Company has not yet established an ongoing source of revenue sufficient to cover its operating costs, and it believes it will need to continue to raise substantial additional capital to accomplish its business plan over the next several years. Management believes its currently available funding will be sufficient to finance the Company's operations for at least one year from the date these consolidated financial statements are issued. The Company plans to continue to fund its losses from operations and capital funding needs through a combination of public or private equity offerings, debt financings or other sources, including potential corporate collaborations, licenses and other similar arrangements. There can be no assurance as to the availability or terms upon which such financing and capital might be available in the future. If the Company is unable to secure additional funding, it may be forced to curtail or suspend its business plans.

NOTE 3: SUMMARY OF ACCOUNTING POLICIES

Basis of Presentation

The accompanying consolidated financial statements have been prepared pursuant to the rules of the Securities and Exchange Commission (SEC) and in accordance with the accounting principles generally accepted in the U.S. (GAAP) The accompanying consolidated financial statements include the financial statements of Atossa Therapeutics, Inc. and its wholly-owned subsidiaries. All significant intercompany account balances and transactions have been eliminated in consolidation. All amounts have been presented in thousands, except for par value and per share data.

Reclassification

Interest income has been reclassified from prior period amounts to conform to the current year presentation.

Use of Estimates

The preparation of the consolidated financial statements in conformity with GAAP requires management to make estimates and assumptions that affect the reported amounts of assets and liabilities and disclosure of contingent assets and liabilities at the date of the financial statements and the reported amounts of expenses during the reporting period. Actual results could differ from those estimates.

Segments

The Company operates as a single segment. Operating segments are identified as the components of an enterprise of which separate discrete financial information is available for evaluation by the chief operating decision maker in making decisions regarding resource allocation and in assessing performance. To date, our chief operating decision maker has made such decisions and assessed performance at the Company-level as a single segment.

Cash and Cash Equivalents

Cash and equivalents include unrestricted cash and all highly liquid instruments with original maturities of three months or less at date of purchase.

Investments in Equity Securities

The investment in non-marketable securities is carried at cost less any impairment in accordance with Accounting Standards Codification *ASC 321 - Equity*. This investment does not have a readily determinable fair value, so the Company has elected to measure the investment at cost. At each reporting period, the Company will perform an assessment to determine if it still qualifies for this measurement alternative. The Company considered qualitative impairment factors in determining if there were any signs of impairment. Specifically, the Company considered the adverse change in the general market condition of the industry in which Dynamic Cell Therapies, Inc. (DCT) operates and concerns about the investee's ability to continue as a going concern, due to negative cash flows from operations. Based on these impairment indicators, the Company performed a fair value measurement as of December 31, 2022.

The resulting valuation concluded that the investment was not impaired, thus, no impairment has been recorded. The assumptions and estimates used to estimate the fair value of the investment include the following information from DCT:

- Unaudited financial statements;
- Projected technological developments of DCT;
- Current fundraising transactions;
- Current ability of DCT to raise additional financing when needed;
- Changes in the economic environment which may have a material impact on the operating results of DCT, and;
- Timing of a deemed liquidation event occurring.

Fair Value Measurements

The Company records financial assets and liabilities measured on a recurring and non-recurring basis, as well as all non-financial assets and liabilities subject to fair value measurement at the price that would be received to sell an asset or paid to transfer a liability in an orderly transaction between market participants. These fair value principles prioritize valuation inputs across three broad levels. Level 1 inputs are quoted prices (unadjusted) in active markets for identical assets or liabilities. Level 2 inputs are quoted prices for similar assets and liabilities in active markets or inputs that are observable for the asset or liability, either directly or indirectly through market corroboration, for substantially the full term of the financial instrument. Level 3 inputs are unobservable inputs based on the Company's assumptions used to measure assets and liabilities at fair value. An asset or liability's classification within the various levels is determined based on the lowest level input that is significant to the fair value measurement. Please also refer to Note 9.

Research and Development Expenses

Research and development (R&D) costs are generally expensed as incurred. R&D expenses include, for example, manufacturing expense for the Company's drugs under development, expenses associated with clinical trials and associated salaries and benefits. The Company has entered into various research and development contracts with research institutions, clinical research organizations, clinical manufacturing organizations and other companies. Payments for these activities are based on the terms of the individual agreements, which may differ from the pattern of costs incurred, and payments made in advance of performance are reflected in the accompanying consolidated balance sheets as prepaid expenses. The Company records accruals for estimated costs incurred for ongoing research and development activities. When evaluating the adequacy of the accrued expenses, the Company analyzes progress of the services, including the phase or completion of events, invoices received and contracted costs. Significant judgments and estimates may be made in determining the prepaid expense or accrued expense balances at the end of any reporting period. Actual results could differ from the Company’s estimates.

R&D expenses also include an allocation of the CEO's salary and related benefits, including bonus and non-cash stock-based compensation expense based on an estimate of total hours expended on research and development activities. The Company's CEO is involved in the development of the Company's drug candidates and oversight of the related clinical trial activity.

Stock-based Payments

The Company measures and recognizes compensation expense for all stock-based payment awards made to employees, non-employee directors, and consultants, including employee stock options. Stock compensation expense is based on the estimated grant date fair value and is recognized as an expense over the requisite service period. The Company has made a policy election to recognize forfeitures when they occur.

The fair value of each option grant is estimated using the Black-Scholes option-pricing model, which requires assumptions regarding the expected volatility of the price of the Company's common stock, the expected life of the options, an expectation regarding future dividends on the Company’s common stock, and estimation of an appropriate risk-free interest rate. The Company’s expected common stock price volatility assumption is based upon the historical volatility of the Company's stock price. The Company has elected the simplified method for the expected life assumption for stock option grants, which averages the contractual term of the options of ten years with the vesting term, typically one to four years, as the Company does not have sufficient history of option exercise experience. The dividend yield assumption of zero is based upon the fact that the Company has never paid cash dividends and presently has no intention of paying cash dividends in the future. The risk-free interest rate used for each grant is based upon prevailing short-term interest rates over the expected lives of the options.

Income Taxes

The Company accounts for income taxes under the asset and liability method. Under this method, deferred tax assets and liabilities are determined based on differences between financial reporting and tax bases of assets and liabilities and are measured using enacted tax rates and laws that are expected to be in effect when the differences are expected to be recovered or settled. Realization of deferred tax assets is dependent upon future taxable income. A valuation allowance is recognized if it is more likely than not that some portion or all of a deferred tax asset will not be realized based on the weight of available evidence, including expected future earnings. The Company recognizes an uncertain tax position in its financial statements when it concludes that a tax position is more likely than not to be sustained upon examination based solely on its technical merits. Only after a tax position passes the first step of recognition will measurement be required. Under the measurement step, the tax benefit is measured as the largest amount of benefit that is more likely than not to be realized upon effective settlement. This is determined on a cumulative probability basis. The full impact of any change in recognition or measurement is reflected in the period in which such change occurs. The Company elects to accrue any interest or penalties related to income taxes as part of its income tax expense.

Leases

The Company evaluates all contractual agreements at inception to determine if they contain a lease. Lease liabilities are measured at present value of lease payments not yet paid, using a discounted cash flow model that requires the use of a discount rate, or incremental borrowing rate. The Company does not record right-of-use assets or operating lease liabilities on leases with initial terms of 12 months or less (short-term). All Company leases are short-term in duration; therefore, no right of use assets or lease liabilities are recorded as of December 31, 2022 or 2021.

Foreign Currency Translation and Transactions

The majority of the Company's operations occur in entities that have the U.S. dollar as their functional currency. The one non-U.S. dollar denominated functional currency subsidiary has assets and liabilities translated into U.S. dollars at rates of exchange in effect at the end of the year. Expense amounts are translated using the average exchange rates for the period. Net unrealized gains and losses resulting from foreign currency translation are recorded in Other expense, net in the consolidated statements of operations. The Company had realized losses on foreign currency exchange during the years ended December 31, 2022 and 2021 of $122 and $72, respectively, which are included in Other expense, net in the consolidated statements of operations.

Recently Adopted Accounting Pronouncements

On May 3, 2021, the Financial Accounting Standards Board (FASB) issued Accounting Standards Update (ASU) No. 2021-04, *Issuer's Accounting for Certain Modifications or Exchanges of Freestanding Equity-Classified Written Call Options* — a consensus of the FASB Emerging Issues Task Force. The ASU provides a principles-based framework to determine whether an issuer should recognize the modification or exchange as an adjustment to equity or an expense. As there were no modifications or exchanges of freestanding equity-classified warrants during the year ended December 31, 2022, the standard did not have an impact on the consolidated financial statements.

On January 1, 2022, the Company adopted ASU No. 2021-10, *Annual Disclosure Requirements for Business Entities Receiving Government Assistance (Topic 832) – Disclosures by Business Entities about Government Assistance*, which requires business entities to disclose information about transactions with a government that are accounted for by applying a grant or contribution model by analogy. For transactions within scope, the new standard requires the disclosure of information about the nature of the transaction, including significant terms and conditions, as well as the amounts and specific financial statement line items affected by the transaction. The disclosure of the Company's research and development tax rebate receivable is detailed in Note 7.

NOTE 4: INVESTMENT IN EQUITY SECURITIES

On July 1, 2022, the Company entered into a letter agreement (the "Letter Agreement") with Dynamic Cell Therapies, Inc, a U.S. private company that is in the pre-clinical stage of developing novel Chimeric Antigen Receptor (CAR) T-cell therapies based on technology licensed from a leading U.S. cancer treatment and research institution. The Letter Agreement required that up until November 1, 2022, DCT would (i) negotiate exclusively with the Company for the Company to acquire DCT, and (ii) address certain matters related to personnel, operations and intellectual property. The Company paid $2,700 on July 2, 2022 for the exclusive right to negotiate with DCT. If by November 1, 2022, a definitive agreement was not reached for the Company to acquire DCT and a specific material adverse event had not occurred, the Company would pay an additional $2,000 for a preferred stock equity interest of 19.99% of the then outstanding total equity in DCT. On December 23, 2022, the Company paid $2,000 to DCT. In total, the Company paid $4,700 to DCT and received Series Seed Preferred Shares representing approximately 19% of the post-investment outstanding shares of DCT.

The Company reviewed its investment in DCT to determine whether or not the Company has a variable interest in DCT and whether DCT would meet the definition of a variable interest entity in accordance with *Accounting Standards Codification (ASC) Topic 810, Consolidation*. The Company determined that DCT was a variable interest entity, however, the Company is not the primary beneficiary and does not control DCT. The investment in DCT has been accounted for as an investment in equity securities on the consolidated balance sheet. For equity interests without a readily determinable fair value, an entity may elect to measure these investments at cost minus any impairment. The Company has elected to carry this investment in non-marketable securities at cost less any impairment in accordance with *ASC 321 - Equity*. At each reporting period, the Company will perform an assessment to determine if it still qualifies for this measurement alternative.

The Company considered qualitative impairment factors in determining if there were any signs of impairment. Specifically, the Company considered the adverse change in the general market condition of the industry in which DCT operates and concerns about the investee's ability to continue as a going concern, due to negative cash flows from operations. Based on these impairment indicators, the Company performed a fair value measurement as of December 31, 2022. The resulting valuation concluded that the investment was not impaired, thus, no impairment has been recorded as of December 31, 2022. At each reporting period, the Company will continue to evaluate this investment for impairment and will continue to perform qualitative assessments considering potential impairment indicators.

NOTE 5: RESTRICTED CASH

The Company's restricted cash balance of $110 as of December 31, 2022 and 2021, consisted entirely of cash pledged as security for the Company’s issued commercial credit cards.

NOTE 6: PREPAID EXPENSES

Prepaid expenses consisted of the following:

	December 31, 2022	December 31, 2021
Prepaid research and development	$ 3,480	$ 1,853
Prepaid insurance	387	461
Professional services	130	124
Retainer and security deposits	-	14
Prepaid rent	-	5
Other	34	31
Total prepaid expenses	$ 4,031	$ 2,488

NOTE 7: RESEARCH AND DEVELOPMENT TAX REBATE RECEIVABLE

On May 23, 2017, the Company formed a wholly-owned subsidiary in Australia called Atossa Genetics AUS Pty Ltd. The purpose of this subsidiary is to perform R&D activities, including some of the Company's clinical trials. Australia offers an R&D cash rebate of $0.435 per dollar spent on qualified R&D activities incurred in the country. For entities with over 80% of revenue from passive sources, the rate increases to $0.485 per dollar. The Australian R&D tax incentive program is a self-assessment process, and as such, the Australian Government has the right to review the Company’s qualifying programs and related expenditures for a period of four years. If such a review were to occur, and as a result of the review and failure of a related appeal, a qualified program and related expenditures could be disqualified, and the respective R&D rebates of $2,028 collected could be recalled with penalties and interest. The Company uses the grant accounting model by analogy to International Accounting Standards (IAS) 20 to account for the cash rebates received from the Australian government.

During the years ended December 31, 2022 and 2021, the Company incurred qualified R&D expenses in Australia of $1,546 and $1,251, respectively. The Company collected R&D cash rebates of $1,001 and $0, during the years ended December 31, 2022 and 2021, respectively. At December 31, 2022 and 2021, the Company had a total R&D rebate receivable of $743 and $1,072, respectively. The Company records the R&D rebate credit in the period when it incurs the associated R&D cost. As such, the rebate reduced the R&D expense line item on the Consolidated Statements of Operations by $728 and $498 for the years ended December 31, 2022 and 2021, respectively.

NOTE 8: PAYROLL LIABILITIES

Payroll liabilities consisted of the following:

	As of December 31, 2022	As of December 31, 2021
Accrued bonuses	$ 1,060	$ 894
Accrued vacation	224	183
Accrued payroll	241	107
Total payroll liabilities	$ 1,525	$ 1,184

NOTE 9: FAIR VALUE OF FINANCIAL INSTRUMENTS

Pursuant to the accounting guidance for fair value measurement and its subsequent updates, fair value is defined as the price that would be received to sell an asset or paid to transfer a liability (i.e., the “exit price”) in an orderly transaction between market participants at the measurement date. The accounting guidance establishes a hierarchy for inputs used in measuring fair value that minimizes the use of unobservable inputs by requiring the use of observable market data when available. Observable inputs are inputs that market participants would use in pricing the asset or liability based on active market data. Unobservable inputs are inputs that reflect the assumptions market participants would use in pricing the asset or liability based on the best information available in the circumstances.

The fair value hierarchy is broken down into the three input levels summarized below:

● *Level 1* —Valuations are based on quoted prices in active markets for identical assets or liabilities and readily accessible by us at the reporting date. Examples of assets and liabilities utilizing Level 1 inputs are certain money market funds, U.S. Treasuries and trading securities with quoted prices on active markets.

● *Level 2* —Valuations based on inputs other than the quoted prices in active markets that are observable either directly or indirectly in active markets. Examples of assets and liabilities utilizing Level 2 inputs are U.S. government agency bonds, corporate bonds, commercial paper, certificates of deposit and over-the- counter derivatives.

● *Level 3* —Valuations based on unobservable inputs in which there are little or no market data, which require the Company to develop its own assumptions.

The following tables present the Company's fair value hierarchy for all its financial assets and liabilities, by main security type, measured at fair value on a recurring basis:

December 31, 2022	Estimated Fair Value	Level 1	Level 2	Level 3
Assets:				
Money market account	$ 102,681	$ 102,681	$ -	$ -

December 31, 2021	Estimated Fair Value	Level 1	Level 2	Level 3
Assets:				
Money market account	$ 51,796	$ 51,796	$ -	$ -

The warrants issued in December 2020 contained certain provisions that may have required the Company to settle the warrants in cash should an event outside the Company's control occur, and therefore, they were accounted for as liabilities, with changes in the fair values included in net loss for the respective periods. Because some of the inputs to the valuation model were either not observable or were not derived primarily from or corroborated by observable market data by correlation or other means, the warrant liability was classified as Level 3 in the fair value hierarchy. On January 1, 2021, the Company early adopted ASU No. 2020-06, *Debt – Debt with Conversion and Other Options (Topic 470) and Derivative Hedging - Contracts in an Entity's Own Equity (Topic 815)*. Upon adoption, the Company recorded a cumulative adjustment to beginning Stockholders' Equity in the amount of $13,003 to reclassify the common stock warrant liability to accumulated deficit and additional paid-in capital.

The following table summarizes the changes in the Company's Level 3 warrant liability for the year ended December 31, 2021:

Warrant Liability	
Beginning balance	$ 13,003
Reclassification of equity upon adoption of accounting standard	(13,003)
Issuance of warrants	-
Change in fair value	-
Ending balance	$ -

NOTE 10: STOCKHOLDERS' EQUITY

The Company is authorized to issue a total of 185,000 shares of stock consisting of 175,000 shares of common stock, par value $0.18 per share, and 10,000 shares of preferred stock, par value $0.001 per share. The Company has designated 750 shares of Series A junior participating preferred stock, par value $0.001 per share, 4 shares of Series A convertible preferred stock, par value $0.001 per share, 25 shares of Series B convertible preferred stock, par value $0.001 and 20 shares of Series C convertible preferred stock, par value $0.001 per share, through the filings of certificates of designation with the Delaware Secretary of State. No shares of Series A junior participating preferred stock, no shares of Series A convertible preferred stock and no shares of Series C convertible preferred stock were outstanding as of December 31, 2022 or 2021.

On May 19, 2014, the Company adopted a stockholder rights agreement which provides that all stockholders of record on May 26, 2014, received a non-taxable distribution of one preferred stock purchase right for each share of the Company's common stock held by such stockholder. Each right is attached to and trades with the associated share of common stock. The rights will become exercisable only if one of the following occurs: (1) a person becomes an "Acquiring Person" by acquiring beneficial ownership of 15% or more of the Company's common stock (or, in the case of a person who beneficially owned 15% or more of the Company's common stock on the date the stockholder rights agreement was executed, by acquiring beneficial ownership of additional shares representing 2.0% of the Company's common stock then outstanding (excluding compensatory arrangements)), or (2) a person commences a tender offer that, if consummated, would result in such person becoming an Acquiring Person. If a person becomes an Acquiring Person, each right will entitle the holder, other than the Acquiring Person and certain related parties, to purchase a number of shares of the Company's common stock with a market value that equals twice the exercise price of the right. The initial exercise price of each right is $15.00, so each holder (other than the Acquiring Person and certain related parties) exercising a right would be entitled to receive $30.00 worth of the Company's common stock. If the Company is acquired in a merger or similar business combination transaction at any time after a person has become an Acquiring Person, each holder of a right (other than the Acquiring Person and certain related parties) will be entitled to purchase a similar amount of stock of the acquiring entity.

2021 Financing Transactions

On January 6, 2021, the Company entered into a securities purchase agreement with certain institutional and accredited investors relating to the offering and sale of 23,850 shares of Company common stock, par value $0.18 per share and warrants to purchase 17,888 shares of common stock. The combined purchase price for one share of common stock and a warrant to purchase 0.75 shares of common stock was $1.055. Subject to certain ownership limitations, the warrants are exercisable upon issuance. The warrants will expire on the 4.5-year anniversary of the date of issuance and have an exercise price of $1.055 per share. The common stock and warrants have been registered under the Securities Act of 1933, as amended. The offering closed on January 8, 2021, with net proceeds to the Company from the offering of $23,300 after deducting fees and expenses.

On March 22, 2021, the Company entered into a securities purchase agreement with certain institutional and accredited investors relating to the offering and sale of 17,361 shares of our common stock, par value $0.18 per share. Concurrently with the offering, and pursuant to the purchase agreement, the Company also commenced a private placement whereby it issued and sold warrants exercisable for an aggregate of up to 13,021 shares of common stock. The combined purchase price for one share of common stock and a purchase warrant to purchase 0.75 shares of common stock was $2.88. Subject to certain ownership limitations, the warrants are exercisable upon issuance. The warrants will expire on the 4.5-year anniversary of the date of issuance. The net proceeds to the Company from the offering and the private placement were $46,400, after deducting fees and expenses.

Series B Convertible Preferred Stock

Conversion. Each share of Series B convertible preferred stock is convertible at the Company's option at any time on or after the first anniversary of the closing of the rights offering, or at the option of the holder at any time, into the number of shares of our common stock determined by dividing the $1,000 stated value per share of the Series B convertible preferred stock by a conversion price of $3.52 per share. In addition, the conversion price per share is subject to adjustment for stock dividends, distributions, subdivisions, combinations or reclassifications. Subject to limited exceptions, a holder of the Series B convertible preferred stock will not have the right to convert any portion of the Series B convertible preferred stock to the extent that, after giving effect to the conversion, the holder, together with its affiliates, would beneficially own in excess of 9.99% of the number of shares of our common stock outstanding immediately after giving effect to its conversion.

Fundamental Transactions. In the event the Company effects certain mergers, consolidations, sales of substantially all of its assets, tender or exchange offers, reclassifications or share exchanges in which its common stock is effectively converted into or exchanged for other securities, cash or property, the Company consummates a business combination in which another person acquires 50% of the outstanding shares of our common stock, or any person or group becomes the beneficial owner of 50% of the aggregate ordinary voting power represented by our issued and outstanding common stock, then, upon any subsequent conversion of the Series B convertible preferred stock, the holders of the Series B convertible preferred stock will have the right to receive any shares of the acquiring corporation or other consideration it would have been entitled to receive if it had been a holder of the number of shares of common stock then issuable upon conversion in full of the Series B convertible preferred stock.

Dividends. Holders of Series B convertible preferred stock shall be entitled to receive dividends (on an as-if-converted-to-common-stock basis) in the same form as dividends actually paid on shares of the common stock when, as and if such dividends are paid on shares of common stock.

Voting Rights. Except as otherwise provided in the certificate of designation or as otherwise required by law, the Series B convertible preferred stock has no voting rights.

Liquidation Preference. Upon the Company's liquidation, dissolution or winding-up, whether voluntary or involuntary, holders of Series B convertible preferred stock will be entitled to receive out of the Company's assets, whether capital or surplus, the same amount that a holder of common stock would receive if the Series B convertible preferred stock were fully converted (disregarding for such purpose any conversion limitations under the certificate of designation) to common stock, which amounts shall be paid pari passu with all holders of common stock.

Redemption Rights. The Company is not obligated to redeem or repurchase any shares of Series B convertible preferred stock. Shares of Series B convertible preferred stock are not otherwise entitled to any redemption rights, or mandatory sinking fund or analogous provisions.

2021 and 2020 Warrants

The terms and conditions of the warrants are as follows:

Exercisability. Each warrant is exercisable at any time and will expire between 4 and 4.5-years from the date of issuance. The warrants are exercisable, at the option of each holder, in whole or in part by delivering to us a duly executed exercise notice and payment in full for the number of shares of our common stock purchased upon such exercise, except in the case of a cashless exercise as discussed below. The number of shares of common stock issuable upon exercise of the warrants is subject to adjustment in certain circumstances, including a stock split of, stock dividend on, or a subdivision, combination or recapitalization of the common stock. Upon the merger, consolidation, sale of substantially all of our assets, or other similar transaction, the holders of warrants shall, at the option of the Company, be required to exercise the warrants immediately prior to the closing of the transaction, or such warrants shall automatically expire. Upon such exercise, the holders of warrants shall participate on the same basis as the holders of common stock in connection with the transaction.

Cashless Exercise. If at any time there is no effective registration statement registering, or the prospectus contained therein is not available for issuance of, the shares issuable upon exercise of the warrant, the holder may exercise the warrant on a cashless basis. When exercised on a cashless basis, a portion of the warrant is cancelled in payment of the purchase price payable in respect of the number of shares of our common stock purchasable upon such exercise.

Exercise Price. Each warrant represents the right to purchase one share of common stock. In addition, the exercise price per share is subject to adjustment for stock dividends, distributions, subdivisions, combinations, or reclassifications, and for certain dilutive issuances. Subject to limited exceptions, a holder of warrants will not have the right to exercise any portion of the warrant to the extent that, after giving effect to the exercise, the holder, together with its affiliates, and any other person acting as a group together with the holder or any of its affiliates, would beneficially own in excess of 4.99% of the number of shares of our common stock outstanding immediately after giving effect to its exercise. The holder, upon notice to the Company, may increase or decrease the beneficial ownership limitation provisions of the warrant, provided that in no event shall the limitation exceed 9.99% of the number of shares of our common stock outstanding immediately after giving effect to the exercise of the warrant.

Transferability. Subject to applicable laws and restrictions, a holder may transfer a warrant upon surrender of the warrant to us with a completed and signed assignment in the form attached to the warrant. The transferring holder will be responsible for any tax liability that may arise as a result of the transfer.

Exchange Listing. The Company does not intend to apply to list the warrants on any securities exchange or recognized trading system.

Rights as Stockholder. Except as set forth in the warrant, the holder of a warrant, solely in such holder’s capacity as a holder of a warrant, will not be entitled to vote, to receive dividends, or to any of the other rights of our stockholders.

Warrants Outstanding

As of December 31, 2022, warrants to purchase 21,515 shares of common stock were outstanding including:

	Outstanding Warrants to Purchase Shares		Exercise Price	Expiration Date
December 2020 warrants	6,490	$	1.00	December 11, 2024-June 21, 2025
January 2021 warrants	4,500	$	1.055	July 8, 2025
March 2021 warrants	10,525	$	2.88	September 22, 2025
	21,515			

Warrant Activity

There were no warrant exercises during the year ended December 31, 2022. During the year ended 2021, the Company received $43,818 from the exercises of warrants. The 2021 warrant exercises resulted in the reduction of 37,451 warrants, and the issuance of 37,451 shares of common stock. On May 30, 2022, all 762 of the warrants issued in May 2018 expired, unexercised, with an exercise price of $4.05 per share.

Conversion of Convertible Preferred Stock

During the year ended December 31, 2022, there were no conversions of Series B convertible preferred stock. During the year ended December 31, 2021, certain holders of the Series B convertible preferred stock exercised their conversion option and converted an aggregate of 0.039 of their shares into 11 shares of the Company's common stock based on the conversion ratio of 284 shares of common stock for each share of Series B convertible preferred stock.

NOTE 11: NET LOSS PER SHARE

The Company follows the two-class method when computing net loss per share as the Company has issued warrants and preferred stock that meet the definition of participating securities. The two-class method determines net loss per share for each class of common and participating securities according to dividends declared or accumulated and participation rights in undistributed earnings. The two-class method requires income available to common stockholders for the period to be allocated between common and participating securities based upon their respective rights to receive dividends as if all income for the period had been distributed.

Basic net loss per common share is computed by dividing net loss attributable to common stockholders by the weighted average number of common shares outstanding. In addition, in computing the dilutive effect of convertible securities, the numerator is adjusted to add back any convertible preferred dividends. Diluted net loss per common share is computed by dividing net loss attributable to common stockholders by the weighted average number of common shares that would have been outstanding during the period assuming the issuance of common shares for all potential dilutive common shares outstanding. Potential common shares consist of potential future exercises of outstanding stock options and common stock warrants. Because the inclusion of potential common shares would be anti-dilutive for all periods presented, they have been excluded from the calculation.

The Company’s common stock warrants and preferred stock contractually entitles the holders of such securities to participate in dividends but do not contractually require the holders of such securities to participate in losses of the Company. Accordingly, in periods in which the Company reports a net loss, such losses are not allocated to such participating securities. In periods in which the Company reports a net loss attributable to common stockholders, diluted net loss per share attributable to common stockholders is the same as basic net loss per share attributable to common stockholders, since dilutive common shares are not assumed to have been issued if their effect is anti-dilutive. The Company reported a net loss attributable to common stockholders for the years ended December 31, 2022, and 2021.

The following table summarizes the Company’s calculation of net loss per common share:

	Year Ended December 31,			
	2022		2021	
Numerator				
Net loss	$	(26,960)	$	(20,606)
Denominator				
Weighted average common shares outstanding used to compute net loss per share, basic and diluted		126,624		116,950
Net loss per share of common stock, basic and diluted:	$	(0.21)	$	(0.18)

The following table sets forth the weighted average number of potential common shares excluded from the calculation of net loss per diluted share, because including them would be anti-dilutive:

	Year Ended December 31,	
	2022	2021
Options to purchase common stock	12,990	9,036
Series B convertible preferred stock	165	171
Warrants to purchase common stock	21,826	24,144
	34,981	33,351

NOTE 12: INCOME TAXES

The Company accounts for income taxes using the asset and liability method, under which deferred income tax assets and liabilities are recognized for the estimated future tax consequences attributable to differences between the financial reporting and tax bases of assets and liabilities and are measured using enacted tax rates in effect for the year in which those temporary differences are expected to be recovered or settled. A valuation allowance is provided for the amount of deferred tax assets that, based on available evidence, are not expected to be realized. The Company did not record an income tax benefit for its losses incurred for the years ended December 31, 2022 or 2021, due to uncertainty regarding utilization of its net operating loss carryforwards and due to its history of losses.

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

	Year Ended December 31,	
	2022	2021
Expected federal income tax benefit	$ (5,662)	$ (4,327)
Disallowed R&D expenses	351	-
Non-taxable R&D rebate	(156)	-
Other permanent items	214	81
Return to provision	862	(100)
Stock-based compensation adjustment	213	
Foreign rate differential	(270)	-
Other	27	-
Recognition of foreign net operating loss carryforwards	-	(557)
Effect of change in valuation allowance	4,421	4,903
Actual federal income tax benefit	$ -	$ -

The components of net deferred tax assets and liabilities were as follows:

	As of December 31,	
	2022	2021
Deferred tax assets		
Accrued bonus	222	-
Accrued vacation	47	38
Stock-based compensation	4,067	3,007
Capitalized R&D expenses	3,155	-
Intangible assets, net	315	382
Net operating loss carryforwards	11,522	11,511
Other	-	-
Valuation allowance	(19,327)	(14,937)
Deferred tax asset	$ 1	$ 1
Deferred tax liabilities		
Fixed assets	$ (1)	$ (1)
Net deferred tax asset	$ -	$ -

Based on an assessment of all available evidence including, but not limited to the Company's limited operating history in its core business and the Company's pre-revenue status, uncertainties of the commercial viability of its technology, the impact of government regulation and healthcare reform initiatives, and other risks normally associated with biotechnology companies, the Company has concluded that it is more likely than not that these net operating loss carryforwards and other deferred tax assets will not be realized and, as a result, a full valuation allowance has been recorded against the Company's deferred income tax assets. Utilization of the net operating loss 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 the Internal Revenue Code Section 382. In general, an "ownership change," as defined by Section 382, 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 or public groups. Any limitation may result in expiration of all or a portion of the net operating loss carryforwards before utilization. Since the Company's initial public offering, ownership changes have triggered a Section 382 limitation, which limits the ability to utilize net operating loss carryforwards.

The Company has incurred net operating losses from inception. At December 31, 2022, the Company had domestic federal net operating loss carryforwards of $99,047 and foreign net operating loss carryforwards of $1,514. In previous years, the Company completed public offerings, which triggered ownership changes under Section 382. The Company believes that as of December 31, 2022, the gross net operating loss carryforwards is limited to $52,700, which are available to reduce future taxable income. Federal net operating loss carryforwards generated through December 31, 2017 expire at various dates beginning 2029 through 2038, while federal net operating loss carryforwards generated during or after 2018 do not expire. Foreign net operating losses do not expire. The Company recorded a valuation allowance against all of its net deferred tax assets of $19,327 and $14,937 as of as of December 31, 2021, respectively, for a net increase of $4,390 from 2021 to 2022 and a net increase of $4,903 from 2020 to 2021.

Historically, Section 174 allowed taxpayers to deduct R&D expenses in the same year incurred and companies that engage in research-based activities relied on full expensing as a significant cost recovery mechanism. The Tax Cut and Jobs Act (TCJA) resulted in significant changes to the treatment of R&D expenses under Section 174. For tax years beginning after December 31, 2021, taxpayers are required to capitalize and amortize all R&D expenses paid or incurred during the year in the regular course of business. R&D expenses incurred in the U.S. during the year have been amortized over a five-year period and R&D expenses incurred in Australia during the year have been amortized over a fifteen-year period. All direct R&D expenses as classified on the Consolidated Statement of Operations have been capitalized and indirect R&D expenses included in G&A on the Consolidated Statement of Operations have been capitalized based on R&D compensation as a percent of total compensation other than legal patent expenses which have been fully capitalized.

The Company files income tax returns in the U.S. and Australia. The Company is subject to tax examinations for the 2016 tax year and beyond. The Company has no unrecognized tax positions and does not believe there will be any material changes in its unrecognized tax positions over the next 12 months. The Company has not incurred any interest or penalties related to unrecognized tax positions. In the event that the Company is assessed interest or penalties at some point in the future, they will be classified in the consolidated financial statements as general and administrative expense.

NOTE 13: CONCENTRATION OF CREDIT RISK

Financial instruments that potentially subject the Company to concentration of credit risk consist primarily of cash deposits. Accounts at each institution are insured by the Federal Deposit Insurance Corporation (FDIC) for up to $250. As of December 31, 2022 and 2021, the Company had $110,647 and $136,185, respectively, in excess of the FDIC insured limit.

NOTE 14: COMMITMENTS AND CONTINGENCIES

Lease Commitments

The Company evaluates all contractual agreements at inception to determine if they contain a lease. Lease liabilities are measured at present value of lease payments not yet paid, using a discounted cash flow model that requires the use of a discount rate, or incremental borrowing rate. Leases with a term of 12 months or less are considered short term operating leases and no asset or liability is recognized.

The Company's operating lease assets consist of an office lease and a copier system lease. The Company's office lease expired February 28, 2022. On March 1, 2022, the Company entered into a new short-term operating lease for office space to pay monthly rent of $1 for a term of 12 months. The Company's copier system lease expired in October 2021 and was not renewed. The Company had lease expense under short term leases of $15 and $26 during the year ended December 31, 2022, and 2021, respectively.

Litigation and Contingencies

The Company is subject to legal proceedings and claims that arise in the normal course of business. The Company believes that these matters are either without merit or of a kind that should not have a material effect, individually or in the aggregate, on its financial position, results of operations or cash flows.

NOTE 15: STOCK BASED COMPENSATION

On March 24, 2020, the Board of Directors approved the adoption of the 2020 Stock Incentive Plan (the 2020 Plan) to provide for the grant of equity-based awards to employees, officers, non-employee directors and other key persons providing services to the Company. No awards may be granted under the 2020 Plan after the date that is 10 years from the date of stockholder approval. An aggregate of 3,000 shares were initially reserved for issuance in connection with awards granted under the 2020 Plan. On May 14, 2021, the stockholders approved an additional 15,000 shares available for issuance under the 2020 Plan. There were 8,251 options available for future grants under the 2020 Plan as of December 31, 2022.

On September 28, 2010, the Board of Directors approved the adoption of the 2010 Stock Option and Incentive Plan (the 2010 Plan) to provide for the grant of equity-based awards to employees, officers, non-employee directors and other key persons providing services to the Company. Awards of incentive options could be granted under the 2010 Plan until September 2020. Shares may no longer be granted under this plan.

The Company granted 4,079 and 3,819 options to purchase shares of common stock to employees and directors during the years ended December 31, 2022 and 2021, respectively. The weighted average grant date fair value of options granted during 2022 and 2021 was $0.96 and $2.56, respectively. There were 699 options exercised during the year ended December 31, 2021, at a weighted average exercise price of $2.46. The Company issued 298 new common shares upon net exercise of these options. No options were exercised during the year ended December 31, 2022.

The fair values of stock options granted were calculated using the Black-Scholes option-pricing model applying the following assumptions:

	Year Ended December 31,	
	2022	2021
Risk-free interest rate	1.86% - 3.56%	0.89% - 1.08%
Expected term (in years)	5.19 - 6.11	5.31 - 6.17
Dividend yield	-	-
Expected volatility	103% - 128%	122% - 130%

Compensation costs associated with the Company's stock options are recognized, based on the grant-date fair values of these options, over the requisite service period, or vesting period.

Accordingly, the Company recognized stock-based compensation expense, which was included in the following line items, in the Consolidated Statements of Operations:

	Year Ended December 31,	
	2022	2021
General and administrative	$ 4,395	$ 3,676
Research and development	2,393	1,591
Total stock compensation expense	$ 6,788	$ 5,267

Options issued and outstanding as of December 31, 2022, and their activities during the year ended 2022 are as follows:

	Number of Underlying Shares	Weighted-Average Exercise Price Per Share	Weighted-Average Contractual Life Remaining in Years	Aggregate Intrinsic Value
Outstanding as of January 1, 2022	10,027	$ 2.82		
Granted	4,079	1.13		$ 51
Forfeited	(200)	0.91		
Exercised	-	-		
Expired	-	-		-
Outstanding as of December 31, 2022	13,906	$ 2.35	7.82	$ -
Exercisable as of December 31, 2022	10,283	$ 2.59	7.41	$ -
Vested and expected to vest	13,906	$ 2.35	7.82	$ -

On December 31, 2022, there were 3,623 unvested options outstanding, and the related unrecognized total compensation cost associated with these options was $4,157. This expense is expected to be recognized over a weighted-average period of 1.04 years.

EXHIBIT INDEX

Exhibit No.	Description	Incorporated by Reference Herein	
		Form	Date
3.1	Amended and Restated Certificate of Incorporation	Amendment No.3 to Registration Statement on Form S-1, as Exhibit 3.2	June 11, 2012
3.2	Certificate of Amendment to Amended and Restated Certificate of Incorporation	Current Report on Form 8-K, as Exhibit 4.1	August 26, 2016
3.3	Certificate of Amendment to Amended and Restated Certificate of Incorporation	Current Report on Form 8-K, as Exhibit 4.1	April 23, 2018
3.4	Certificate of Amendment to Amended and Restated Certificate of Incorporation	Current Report on Form 8-K, as Exhibit 3.1	January 7, 2020
3.5	Amended and Restated Bylaws	Current Report on Form 8-K, as Exhibit 3.2	January 7, 2020
3.6	Certificate of Designation Preferences, and Rights of Series A Junior Participating Preferred Stock	Current Report on Form 8-K, as Exhibit 3.1	May 22, 2014
3.7	Certificate of Designation of Preferences, Rights and Limitations of Series A Convertible Preferred Stock	Quarterly Report on Form 10-Q, as Exhibit 3.1	May 11, 2017
3.8	Certificate of Designation of Preferences, Rights and Limitations of Series B Convertible Preferred Stock	Current Report on Form 8-K, as Exhibit 3.1	May 31, 2018
3.9	Certificate of Designation of Preferences, Rights and Limitations of Series C Convertible Preferred Stock	Current Report on Form 8-K, as Exhibit 3.1	December 14, 2020
4.1	Specimen Common Stock Certificate	Amendment No. 2 to Registration Statement on Form S-1, as Exhibit 4.1	May 21, 2012
4.2	Form of Warrant	Amendment No.1 to Registration Statement on Form S-1 as Exhibit 4.3	April 23, 2018
4.3	Form of Warrant	Current Report on Form 8-K, as Exhibit 4.1	December 14, 2020
4.4	Form of Warrant	Current Report on Form 8-K, as Exhibit 4.1	December 21, 2020
4.5	Form of Warrant	Current Report on Form 8-K, as Exhibit 4.1	January 8, 2021
4.6	Form of Warrant	Current Report on Form 8-K, as Exhibit 4.1	March 23, 2021
4.6	Form of Senior Indenture	Registration Statement on Form S-3, as Exhibit 4.1	September 2, 2020
4.7	Description of Securities Registered Pursuant to Section 12 of the Securities Exchange Act of 1934	Annual Report on Form 10-K, as Exhibit 4.16	March 26, 2020

10.1#	Restated and Amended Employment Agreement with Steven Quay dated September 27, 2010	Registration Statement on Form S-1, as Exhibit 10.3	February 14, 2012
10.2#	Amended and Restated Employment Agreement with Kyle Guse dated May 18, 2016	Current Report on Form 8-K, as Exhibit 10.1	May 20, 2016
10.3#	Form of Indemnification Agreement	Filed herewith	
10.4#	2010 Stock Option and incentive Plan, as amended	Current Report on Form 8-K, as Exhibit 4.2	January 15, 2019
10.5#	Form of Non-Qualified Stock Option Agreement for Employees	Amendment No. 3 to Registration Statement on Form S-1, as Exhibit 10.8	June 11, 2012
10.6#	Form of Non-Qualified Stock Option Agreement for Non-Employee Directors	Amendment No. 3 to Registration Statement on Form S-1, as Exhibit 10.9	June 11, 2012
10.7#	Form of Restricted Stock Award Agreement	Amendment No.3 Registration Statement on Form S-1, as Exhibit 10.13	June 11, 2012
10.8#	Form of 2019 Option Award Agreement	Current Report on Form 8-K, as Exhibit 4.1	January 15, 2019
10.9#	2020 Stock Incentive Plan, as amended	Registration Statement on Form S-8, as Exhibit 99.1	March 31, 2021
10.10#	Form of ISO Option Award Agreement	Quarterly Report on Form 10-Q, as Exhibit 4.1	May 13, 2020
10.11#	Form of Option Award Agreement	Current Report on Form 8-K, as Exhibit 4.1	April 13, 2020
21.1	List of Subsidiaries	Filed herewith	
23.1	Consent of BDO USA, LLP	Filed herewith	
24.1	Powers of Attorney (included in signature page of this Form 10-K)	Filed herewith	
31.1	Certification of Chief Executive Officer Pursuant to Section 302 of the Sarbanes-Oxley Act	Filed herewith	
31.2	Certification Chief Financial Officer Pursuant to Section 302 of the Sarbanes-Oxley Act	Filed herewith	
32.1	Certification of Chief Executive Officer Pursuant to Section 906 of the Sarbanes-Oxley Act	Furnished herewith	
32.2	Certification of Chief Financial Officer Pursuant to Section 906 of the Sarbanes-Oxley Act	Furnished herewith	
101.INS	Inline XBRL Instance Document		
101.SCH	Inline XBRL Taxonomy Extension Schema Document		
101.CAL	Inline XBRL Taxonomy Extension Calculation Linkbase Document		
101.DEF	Inline XBRL Taxonomy Extension Definition Linkbase Document		
101.LAB	Inline XBRL Taxonomy Extension Labels Linkbase Document		
101.PRE	Inline XBRL Taxonomy Extension Presentation Linkbase Document		
104	Cover Page Interactive Data File (embedded within the Inline XBRL and contained in Exhibit 101)		

# Indicates management contract or compensatory plan, contract or agreement.

SIGNATURES

Pursuant to the requirements Section 13 or 15(d) of the Securities Exchange Act of 1934, the issuer, a corporation organized and existing under the laws of the State of Delaware, has duly caused this report to be signed on its behalf by the undersigned thereunto duly authorized in the City of Seattle, State of Washington, on March 22, 2023.

Atossa Therapeutics, Inc.

By: /s/ Steven C. Quay
Steven C. Quay, M.D., Ph.D.
Chairman, Chief Executive Officer and President

POWER OF ATTORNEY

KNOW ALL PERSONS BY THESE PRESENTS, that each person whose signature appears below hereby constitutes and appoints Steven C. Quay and Kyle Guse and each of them acting individually, as his true and lawful attorneys-in-fact and agents, each with full power of substitution, for him in any and all capacities, to sign any and all amendments to this Annual Report on Form 10-K and to file the same, with exhibits thereto and other documents in connection therewith, with the Securities and Exchange Commission, granting unto said attorneys-in-fact and agents, with full power of each to act alone, full power and authority to do and perform each and every act and thing requisite and necessary to be done in connection therewith, as fully for all intents and purposes as he might or could do in person, hereby ratifying and confirming all that said attorneys-in-fact and agents, or his or their substitute or substitutes, may lawfully do or cause to be done by virtue hereof.

Pursuant to the requirements of the Securities Exchange Act of 1934, as amended, this Annual Report on Form 10-K has been signed by the following persons in the capacities and on the dates indicated.

Signature	Office(s)	Date
/s/ Steven C. Quay **Steven C. Quay, M.D., Ph.D.**	Chairman, Chief Executive Officer and President (Principal Executive Officer)	March 22, 2023
/s/ Kyle Guse **Kyle Guse**	Chief Financial Officer, General Counsel and Secretary (Principal Financial and Accounting Officer)	March 22, 2023
/s/ Richard I. Steinhart **Richard I. Steinhart**	Director	March 22, 2023
/s/ Shu-Chih Chen **Shu-Chih Chen, Ph.D.**	Director	March 22, 2023
/s/ Gregory Weaver **Gregory Weaver**	Director	March 22, 2023
/s/ Stephen J. Galli **Stephen J. Galli, M.D.**	Director	March 22, 2023
/s/ H. Lawrence Remmel **H. Lawrence Remmel**	Director	March 22, 2023

EXHIBIT 10.3

ATOSSA THERAPEUTICS, INC.
INDEMNIFICATION AGREEMENT

This Indemnification Agreement ("Agreement") is made effective as of January 6, 2020 (the "Effective Date") by and between Atossa Therapeutics, Inc., a Delaware corporation (the "Company"), and _____ ("Indemnitee").

RECITALS

WHEREAS, the Company, which is organized under the General Corporation Law of the State of Delaware ("DGCL"), wishes to enter into this Agreement to set forth certain rights and obligations of the Indemnitee and the Company with respect to the Indemnitee's service as a director or officer of the Company commencing on the Effective Date;

WHEREAS, it is essential to the Company that it be able to retain and attract as directors and officers the most capable persons available;

WHEREAS, increased corporate litigation has subjected directors and officers to litigation risks and expenses, and the limitations on the availability of directors and officers liability insurance have made it increasingly difficult for the Company to attract and retain such persons;

WHEREAS, the Company's Certificate of Incorporation and Bylaws (the "Charter" and "Bylaws," respectively) require it to indemnify its directors and officers to the fullest extent permitted by law and permit it to make other indemnification arrangements and agreements;

WHEREAS, the Company desires to provide Indemnitee with specific contractual assurance of Indemnitee's rights to full indemnification against litigation risks and expenses, regardless, among other things, of any amendment to or revocation of the Charter or Bylaws or any change in the ownership of the Company or the composition of its Board of Directors (the "Board");

WHEREAS, the Company intends that this Agreement provide Indemnitee with greater protection than that which is provided by the Company's Charter and Bylaws; and

WHEREAS, Indemnitee is relying upon the rights afforded under this Agreement in continuing as a director or officer of the Company, as applicable, and this Agreement shall serve as a supplement to and in furtherance of the indemnification provided in the Bylaws and any resolutions adopted pursuant thereto, and shall not be deemed a substitute therefor, nor to diminish or abrogate any rights of Indemnitee thereunder.

NOW, THEREFORE, in consideration of the premises and the covenants contained herein, the Company and Indemnitee do hereby covenant and agree as follows:

Section 1. Services to the Company. Indemnitee agrees to serve as a director or officer of the Company, as applicable. Indemnitee may at any time and for any reason resign from such position (subject to any other contractual obligation or any obligation imposed by law), in which event the Company shall have no obligation under this Agreement to continue Indemnitee in such position. This Agreement shall not be deemed an employment contract between the Company (or any of its subsidiaries or any Enterprise) and Indemnitee. The foregoing notwithstanding, this Agreement shall continue in force after Indemnitee has ceased to serve as a director or officer of the Company.

Section 2. Definitions.

As used in this Agreement:

(a) "Corporate Status" describes the status of a person as a current or former director, officer, employee, agent or trustee of the Company or of any other Enterprise which such person is or was serving at the request of the Company.

(b) "Enforcement Expenses" shall include all reasonable attorneys' fees, retainers, court costs, transcript costs, fees of experts, witness fees, travel expenses, duplicating costs, printing and binding costs, telephone charges, postage, delivery service fees, and all other disbursements or expenses of the types customarily incurred in connection with an action to enforce indemnification or advancement rights, or an appeal from such action, including without limitation the premium, security for, and other costs relating to any cost bond, supersedes bond, or other appeal bond or its equivalent.

(c) "Enterprise" shall mean any corporation (other than the Company), partnership, joint venture, trust, employee benefit plan or other legal entity of which Indemnitee is or was serving at the request of the Company as a director, officer, employee, agent or trustee.

(d) "Expenses" shall include all reasonable attorneys' fees, retainers, court costs, transcript costs, fees of experts, witness fees, travel expenses, duplicating costs, printing and binding costs, telephone charges, postage, delivery service fees, and all other disbursements or expenses of the types customarily incurred in connection with prosecuting, defending, preparing to prosecute or defend, investigating, being or preparing to be a witness in, or otherwise participating in, a Proceeding or an appeal resulting from a Proceeding, including without limitation the premium, security for, and other costs relating to any cost bond, supersedes bond, or other appeal bond or its equivalent. Expenses, however, shall not include amounts paid in settlement by Indemnitee or the amount of judgments or fines against Indemnitee.

(e) "Independent Counsel" means a law firm, or a partner (or, if applicable, member) of such a law firm, that is experienced in matters of Delaware corporation law and neither presently is, nor in the past five years has been, retained to represent: (i) the Company,

any Enterprise or Indemnitee in any matter material to any such party (other than with respect to matters concerning Indemnitee under this Agreement, or of other indemnitees under similar indemnification agreements), or (ii) any other party to the Proceeding giving rise to a claim for indemnification hereunder. Notwithstanding the foregoing, the term "Independent Counsel" shall not include any person who, under the applicable standards of professional conduct then prevailing, would have a conflict of interest in representing either the Company or Indemnitee in an action to determine Indemnitee's rights under this Agreement. The Company agrees to pay the reasonable fees and expenses of the Independent Counsel referred to above and to fully indemnify such counsel against any and all expenses, claims, liabilities and damages arising out of or relating to this Agreement or its engagement pursuant hereto.

(f) The term "Proceeding" shall include any threatened, pending or completed action, suit, arbitration, alternate dispute resolution mechanism, investigation, inquiry, administrative hearing or any other actual, threatened or completed proceeding, whether brought in the right of the Company or otherwise and whether of a civil, criminal, administrative or investigative nature, in which Indemnitee was, is or will be involved as a party or otherwise by reason of the fact that Indemnitee is or was a director or officer of the Company or is or was serving at the request of the Company as a director, officer, employee, agent or trustee of any Enterprise or by reason of any action taken by Indemnitee or of any action taken on Indemnitee's part while acting as director or officer of the Company or while serving at the request of the Company as a director, officer, employee, agent or trustee of any Enterprise, in each case whether or not serving in such capacity at the time any liability or expense is incurred for which indemnification, reimbursement or advancement of expenses can be provided under this Agreement; provided, however, that the term "Proceeding" shall not include any action, suit or arbitration, or part thereof, initiated by Indemnitee to enforce Indemnitee's rights under this Agreement as provided for in Section 13(e) of this Agreement.

Section 3. Indemnity in Third-Party Proceedings. The Company shall indemnify Indemnitee in accordance with the provisions of this Section 3 if Indemnitee is, or is threatened to be made, a party to or a participant in any Proceeding, other than a Proceeding by or in the right of the Company to procure a judgment in its favor. Pursuant to this Section 3, Indemnitee shall be indemnified against all Expenses, judgments, fines and amounts paid in settlement actually and reasonably incurred by Indemnitee or on his or her behalf in connection with such Proceeding or any claim, issue or matter therein, if Indemnitee acted in good faith and in a manner reasonably believed to be in or not opposed to the best interests of the Company and, in the case of a criminal proceeding, had no reasonable cause to believe that his or her conduct was unlawful. Indemnitee shall not enter into any settlement in connection with a Proceeding without the Company's prior written consent, which will not be unreasonably withheld.

Section 4. Indemnity in Proceedings by or in the Right of the Company. The Company shall indemnify Indemnitee in accordance with the provisions of this Section 4 if Indemnitee is, or is threatened to be made, a party to or a participant in any Proceeding by or in the right of the Company to procure a judgment in its favor. Pursuant to this Section 4, Indemnitee shall be indemnified against all Expenses actually and reasonably incurred by or on behalf of Indemnitee in connection with such Proceeding or any claim, issue or matter therein, if Indemnitee acted in good faith and in a manner reasonably believed to be in or not opposed to the best interests of the Company. No indemnification for Expenses shall be made under this Section 4 in respect of any claim, issue or matter as to which Indemnitee shall have been finally adjudged by a court to be liable to the Company, unless and only to the extent that the Delaware Court of Chancery (the "Delaware Court") or any court in which the Proceeding was brought shall determine upon application that, despite the adjudication of liability but in view of all the circumstances of the case, Indemnitee is fairly and reasonably entitled to indemnification for such expenses as the Delaware Court or such other court shall deem proper.

Section 5. Indemnification for Expenses of a Party Who is Wholly or Partly Successful. Notwithstanding any other provisions of this Agreement and except as provided in Section 8, to the extent that Indemnitee is a party to or a participant in and is successful, on the merits or otherwise, in any Proceeding or in defense of any claim, issue or matter therein, the Company shall indemnify Indemnitee against all Expenses actually and reasonably incurred by Indemnitee in connection therewith. If Indemnitee is not wholly successful in such Proceeding but is successful, on the merits or otherwise, as to one or more but less than all claims, issues or matters in such Proceeding, the Company shall indemnify Indemnitee against all Expenses actually and reasonably incurred by or on Indemnitee's behalf in connection with each successfully resolved claim, issue or matter. For purposes of this Section and without limitation, the termination of any claim, issue or matter in such a Proceeding by dismissal, with or without prejudice, shall be deemed to be a successful result as to such claim, issue or matter.

Section 6. Indemnification For Expenses of a Witness. Notwithstanding any other provision of this Agreement, to the extent that Indemnitee is, by reason of his or her Corporate Status, a witness in any Proceeding to which Indemnitee is not a party and is not threatened to be made a party, Indemnitee shall be indemnified against all Expenses actually and reasonably incurred by or on behalf of Indemnitee in connection therewith.

Section 7. Additional Indemnification.

(a) Except as provided in Section 8, notwithstanding any limitation in Sections 3, 4 or 5, the Company shall indemnify Indemnitee to the fullest extent permitted by law if Indemnitee is a party to or is threatened to be made a party to any Proceeding (including a Proceeding by or in the right of the Company to procure a judgment in its favor) against all Expenses, judgments, fines and amounts paid in settlement actually and reasonably incurred by Indemnitee in connection with the Proceeding.

(b) For purposes of Section 7(a), the meaning of the phrase "to the fullest extent permitted by law" shall include, but not be limited to:

(i) to the fullest extent permitted by the provision of the DGCL that authorizes or contemplates additional indemnification by agreement, or the corresponding provision of any amendment to or replacement of the DGCL or such provision thereof; and

(ii) to the fullest extent authorized or permitted by any amendments to or replacements of the DGCL adopted after the date of this Agreement that increase the extent to which a corporation may indemnify its directors and officers.

Section 8. Exclusions. Notwithstanding any provision in this Agreement to the contrary, the Company shall not be obligated under this Agreement:

(a) to make any indemnity for amounts otherwise indemnifiable hereunder (or for which advancement is provided hereunder) if and to the extent that Indemnitee has otherwise actually received such amounts under any insurance policy, contract, agreement or otherwise;

(b) to make any indemnity for an accounting of profits made from the purchase and sale (or sale and purchase) by Indemnitee of securities of the Company within the meaning of Section 16(b) of the Securities Exchange Act of 1934, as amended, or similar provisions of state statutory law or common law;

(c) to make any indemnity or advancement in connection with any Proceeding initiated by Indemnitee against the Company or any director or officer of the Company unless the Company has joined in or the Board has consented to the initiation of such Proceeding, or the Proceeding is one to enforce any of the indemnification rights under this Agreement; or

(d) to make any indemnity or advancement that is prohibited by applicable law.

Section 9. Advances of Expenses. The Company shall advance, to the extent not prohibited by law, the Expenses incurred by Indemnitee in connection with any Proceeding, and such advancement shall be made within twenty (20) days after the receipt by the Company of a statement or statements requesting such advances (which shall include invoices received by Indemnitee in connection with such Expenses but, in the case of invoices in connection with legal services, any references to legal work performed or to expenditures made that would cause Indemnitee to waive any privilege accorded by applicable law shall not be included with the invoice) from time to time, whether prior to or after final disposition of any Proceeding. Advances shall be unsecured and interest free. Advances shall be made without regard to Indemnitee's ability to repay the expenses and without regard to Indemnitee's ultimate entitlement to indemnification under the other provisions of this Agreement. Indemnitee shall qualify for advances upon the execution and delivery to the Company of this Agreement which shall constitute an undertaking providing that Indemnitee undertakes to the fullest extent required by law to repay the advance if and to the extent that it is ultimately determined by a court of competent jurisdiction in a final judgment, not subject to appeal, that Indemnitee is not entitled to be indemnified by the Company. The right to advances under this paragraph shall in all events continue until final disposition of any Proceeding, including any appeal therein. Nothing in this Section 9 shall limit Indemnitee's right to advancement pursuant to Section 13(e) of this Agreement.

Section 10. Procedure for Notification and Defense of Claim.

(a) To obtain indemnification under this Agreement, Indemnitee shall submit to the Company a written request therefor and, if Indemnitee so chooses pursuant to Section 11 of this Agreement, such written request shall also include a request for Indemnitee to have the right to indemnification determined by Independent Counsel.

(b) The Company will be entitled to participate in the Proceeding at its own expense.

Section 11. Procedure Upon Application for Indemnification.

(a) Upon written request by Indemnitee for indemnification pursuant to Section 10(a), a determination, if such determination is required by applicable law, with respect to Indemnitee's entitlement thereto shall be made in the specific case: (i) by Independent Counsel in a written opinion to the Board if Indemnitee so requests in such written request for indemnification pursuant to Section 10(a), or (ii) by the Company in accordance with applicable law if Indemnitee does not so request such determination be made by Independent Counsel. In the case that such determination is made by Independent Counsel, a copy of Independent Counsel's written opinion shall be delivered to Indemnitee and, if it is so determined that Indemnitee is entitled to indemnification, payment to Indemnitee shall be made within ten (10) days after such determination. Indemnitee shall cooperate with the Independent Counsel or the Company, as applicable, making such determination with respect to Indemnitee's entitlement to indemnification, including providing to such counsel or the Company, upon reasonable advance request, any documentation or information which is not privileged or otherwise protected from disclosure and which is reasonably available to Indemnitee and reasonably necessary to such determination. Any costs or expenses (including attorneys' fees and disbursements) incurred by Indemnitee in so cooperating with the Independent Counsel or the Company shall be borne by the Company (irrespective of the determination as to Indemnitee's entitlement to indemnification) and the Company hereby indemnifies and agrees to hold Indemnitee harmless therefrom.

(b) In the event that Indemnitee exercises his or her right to have the entitlement to indemnification determined by Independent Counsel pursuant to clause (i) of Section 11(a), the Independent Counsel shall be selected by Indemnitee. The Company may, within ten (10) days after written notice of such selection, deliver to Indemnitee a written objection to such selection; provided, however, that such objection may be asserted only on the ground that the Independent Counsel so selected does not meet the requirements of "Independent Counsel" as defined in Section 2 of this Agreement, and the objection shall set forth with particularity the factual basis of such assertion. Absent a proper and timely objection, the person so selected shall act as Independent Counsel. If such written objection is so made and substantiated, the Independent Counsel so selected may not serve as Independent Counsel unless and until such objection is withdrawn or a court has determined that such objection is without merit. If, within twenty (20) days after the later of (i) submission by Indemnitee of a written request for indemnification and Independent Counsel pursuant to Sections 10(a) and 11(a)(i) hereof, respectively, and (ii) the final disposition of the Proceeding, including any appeal therein, no Independent Counsel shall have been selected without objection, Indemnitee may petition a court of competent jurisdiction for resolution of any objection which shall have been made by the Company to the selection of Independent Counsel and/or for the appointment as Independent Counsel of a person selected by the court or by such other person as the court shall designate. The person with respect to whom all objections are so resolved or the person so appointed shall act as Independent Counsel under Section 11(a) hereof. Upon the due commencement of any judicial proceeding or arbitration pursuant to Section 13(a) of this Agreement, Independent Counsel shall be discharged and relieved of any further responsibility in such capacity (subject to the applicable standards of professional conduct then prevailing).

Section 12. Presumptions and Effect of Certain Proceedings.

(a) In making a determination with respect to entitlement to indemnification hereunder, it shall be presumed that Indemnitee is entitled to indemnification under this Agreement if Indemnitee has submitted a request for indemnification in accordance with Section 10(a) of this Agreement, and the Company shall have the burden of proof to overcome that presumption in connection with the making of any determination contrary to that presumption. Neither (i) the failure of the Company or of Independent Counsel to have made a determination prior to the commencement of any action pursuant to this Agreement that indemnification is proper in the circumstances because Indemnitee has met the applicable standard of conduct, nor (ii) an actual determination by the Company or by Independent Counsel that Indemnitee has not met such applicable standard of conduct, shall be a defense to the action or create a presumption that Indemnitee has not met the applicable standard of conduct.

(b) The termination of any Proceeding or of any claim, issue or matter therein, by judgment, order, settlement or conviction, or upon a plea of guilty, nolo contendere or its equivalent, shall not (except as otherwise expressly provided in this Agreement) of itself adversely affect the right of Indemnitee to indemnification or create a presumption that Indemnitee did not act in good faith and in a manner reasonably believed to be in or not opposed to the best interests of the Company or, with respect to any criminal Proceeding, that Indemnitee had reasonable cause to believe that his or her conduct was unlawful.

(c) The knowledge and/or actions, or failure to act, of any other director, officer, agent or employee of the Company or any Enterprise shall not be imputed to Indemnitee for purposes of determining the right to indemnification under this Agreement.

Section 13. Remedies of Indemnitee.

(a) Subject to Section 13(f), in the event that (i) a determination is made pursuant to Section 11 of this Agreement that Indemnitee is not entitled to indemnification under this Agreement, (ii) advancement of Expenses is not timely made pursuant to Section 9 of this Agreement, (iii) no determination of entitlement to indemnification shall have been made pursuant to Section 11(a) of this Agreement within sixty (60) days after receipt by the Company of the request for indemnification that does not include a request for Independent Counsel, (iv) payment of indemnification is not made pursuant to Section 5 or 6 or the last sentence of Section 11(a) of this Agreement within ten (10) days after receipt by the Company of a written request therefor or (v) payment of indemnification pursuant to Section 3, 4 or 7 of this Agreement is not made within ten (10) days after a determination has been made that Indemnitee is entitled to indemnification, Indemnitee shall be entitled to an adjudication by a court of his or her entitlement to such indemnification or advancement. Alternatively, Indemnitee, at his or her option, may seek an award in arbitration to be conducted by a single arbitrator pursuant to the Commercial Arbitration Rules of the American Arbitration Association. Indemnitee shall commence such proceeding seeking an adjudication or an award in arbitration within 180 days following the date on which Indemnitee first has the right to commence such proceeding pursuant to this Section 13(a); provided, however, that the foregoing time limitation shall not apply in respect of a proceeding brought by Indemnitee to enforce his or her rights under Section 5 of this Agreement. The Company shall not oppose Indemnitee's right to seek any such adjudication or award in arbitration.

(b) In the event that a determination shall have been made pursuant to Section 11(a) of this Agreement that Indemnitee is not entitled to indemnification, any judicial proceeding or arbitration commenced pursuant to this Section 13 shall be conducted in all respects as a de novo trial, or arbitration, on the merits and Indemnitee shall not be prejudiced by reason of that adverse determination. In any judicial proceeding or arbitration commenced pursuant to this Section 13, the Company shall have the burden of proving Indemnitee is not entitled to indemnification or advancement, as the case may be.

(c) If a determination shall have been made pursuant to Section 11(a) of this Agreement that Indemnitee is entitled to indemnification, the Company shall be bound by such determination in any judicial proceeding or arbitration commenced pursuant to this Section 13, absent (i) a misstatement by Indemnitee of a material fact, or an omission of a material fact necessary to make Indemnitee's statement not materially misleading, in connection with the request for indemnification, or (ii) a prohibition of such indemnification under applicable law.

(d) The Company shall be precluded from asserting in any judicial proceeding or arbitration commenced pursuant to this Section 13 that the procedures and presumptions of this Agreement are not valid, binding and enforceable and shall stipulate in any such court or before any such arbitrator that the Company is bound by all the provisions of this Agreement.

(e) The Company shall indemnify Indemnitee against any and all Enforcement Expenses and, if requested by Indemnitee, shall (within ten (10) days after receipt by the Company of a written request therefor) advance, to the extent not prohibited by law, such Enforcement Expenses to Indemnitee, which are incurred by Indemnitee in connection with any action brought by Indemnitee for indemnification or advancement from the Company under this Agreement or under any directors' and officers' liability insurance policies maintained by the Company, regardless of whether Indemnitee ultimately is determined to be entitled to such indemnification, advancement or insurance recovery, as the case may be, in the suit for which indemnification or advancement is being sought.

(f) Notwithstanding anything in this Agreement to the contrary, no determination as to entitlement to indemnification under this Agreement shall be required to be made prior to the final disposition of the Proceeding, including any appeal therein.

Section 14. Non-exclusivity; Survival of Rights; Insurance; Subrogation.

(a) The rights of indemnification and to receive advancement as provided by this Agreement shall not be deemed exclusive of any other rights to which Indemnitee may at any time be entitled under applicable law, the Charter, the Bylaws, any agreement, a vote of stockholders or a resolution of directors, or otherwise. No amendment, alteration or repeal of this Agreement or of any provision hereof shall limit or restrict any right of Indemnitee under this Agreement in respect of any action taken or omitted by such Indemnitee in his or her Corporate Status prior to such amendment, alteration or repeal. To the extent that a change in Delaware law, whether by statute or judicial decision, permits greater indemnification or advancement than would be afforded currently under the Charter, Bylaws and this Agreement, it is the intent of the parties hereto that Indemnitee shall enjoy by this Agreement the greater benefits so afforded by such change. No right or remedy herein conferred is intended to be exclusive of any other right or remedy, and every other right and remedy shall be cumulative and in addition to every other right and remedy given hereunder or now or hereafter existing at law or in equity or otherwise. The assertion or employment of any right or remedy hereunder, or otherwise, shall not prevent the concurrent assertion or employment of any other right or remedy.

(b) The Company shall, from time to time, make the good faith determination whether or not it is practicable for the Company to obtain and maintain a policy or policies of insurance with a reputable insurance company providing the Indemnitee with coverage for losses from wrongful acts. For so long as Indemnitee shall remain a director or officer of the Company and with respect to any such prior service, in all policies of director and officer liability insurance, Indemnitee shall be named as an insured in such a manner as to provide Indemnitee the same rights and benefits as are afforded to the most favorably insured of the Company's officers and directors. Notwithstanding the foregoing, the Company shall have no obligation to obtain or maintain such insurance if the Company determines in good faith that such insurance is not reasonably available, if the premium costs for such insurance are disproportionate to the amount of coverage provided, or if the coverage provided by such insurance is limited by exclusions so as to provide an insufficient benefit. The Company shall promptly notify Indemnitee of any good faith determination not to provide such coverage. If, at the time of the receipt of a notice of a claim pursuant to the terms hereof, the Company has director and officer liability insurance in effect, the Company shall give prompt notice of the commencement of such proceeding to the insurers in accordance with the procedures set forth in the respective policies. The Company shall thereafter take all necessary or desirable action to cause such insurers to pay, on behalf of Indemnitee, all amounts payable as a result of such proceeding in accordance with the terms of such policies.

(c) In the event of any payment under this Agreement, the Company shall be subrogated to the extent of such payment to all of the rights of recovery of Indemnitee, who shall execute all papers required and take all action necessary to secure such rights, including execution of such documents as are necessary to enable the Company to bring suit to enforce such rights. The Company hereby acknowledges that Indemnitee may have certain rights to indemnification, advancement of expenses and/or insurance provided by certain third parties and their affiliates (collectively, the "Third-Party Indemnitors"). The Company hereby agrees (i) that it is the indemnitor of first resort (i.e., its obligations to Indemnitee are primary and any obligation of the Third-Party Indemnitors to advance expenses or to provide indemnification for the same expenses or liabilities incurred by Indemnitee are secondary), (ii) that it shall be required to advance the full amount of expenses incurred by Indemnitee and shall be liable for the full amount of all Expenses, judgments, penalties, fines and amounts paid in settlement to the extent legally permitted and as required by the terms of this Agreement and the Charter or Bylaws of the Company (or any other agreement between the Company and Indemnitee), without regard to any rights Indemnitee may have against the Third-Party Indemnitors, and, (iii) that it irrevocably waives, relinquishes and releases the Third-Party Indemnitors from any and all claims against the Third-Party Indemnitors for contribution, subrogation or any other recovery of any kind in respect thereof. The Company further agrees that no advancement or payment by the Third-Party Indemnitors on behalf of Indemnitee with respect to any claim for which Indemnitee has sought indemnification from the Company shall affect the foregoing and the Third-Party Indemnitors shall have a right of contribution and/or be subrogated to the extent of such advancement or payment to all of the rights of recovery of Indemnitee against the Company. The Company and Indemnitee agree that the Third-Party Indemnitors are express third-party beneficiaries of the terms of this Section 14(c).

(d) The Company's obligation to provide indemnification or advancement hereunder to Indemnitee who is or was serving at the request of the Company as a director, officer, employee, agent or trustee of any other Enterprise shall be reduced by any amount Indemnitee has actually received as indemnification or advancement from such other Enterprise.

Section 15. Duration of Agreement. This Agreement shall continue until and terminate upon the later of: (a) ten (10) years after the date that Indemnitee shall have ceased to serve as a director or officer of the Company or (b) one (1) year after the final termination of any Proceeding, including any appeal, then pending in respect of which Indemnitee is granted rights of indemnification or advancement hereunder and of any proceeding commenced by Indemnitee pursuant to Section 13 of this Agreement relating thereto. This Agreement shall be binding upon the Company and its successors and assigns and shall inure to the benefit of Indemnitee and his or her heirs, executors and administrators. The Company shall require and cause any successor (whether direct or indirect by purchase, merger, consolidation or otherwise) to all, substantially all or a substantial part, of the business and/or assets of the Company, by written agreement in form and substance satisfactory to Indemnitee, expressly to assume and agree to perform this Agreement in the same manner and to the same extent that the Company would be required to perform if no such succession had taken place.

Section 16. Severability. If any provision or provisions of this Agreement shall be held to be invalid, illegal or unenforceable for any reason whatsoever: (a) the validity, legality and enforceability of the remaining provisions of this Agreement (including without limitation, each portion of any section of this Agreement containing any such provision held to be invalid, illegal or unenforceable, that is not itself invalid, illegal or unenforceable) shall not in any way be affected or impaired thereby and shall remain enforceable to the fullest extent permitted by law; (b) such provision or provisions shall be deemed reformed to the extent necessary to conform to applicable law and to give the maximum effect to the intent of the parties hereto; and (c) to the fullest extent possible, the provisions of this Agreement (including, without limitation, each portion of any section of this Agreement containing any such provision held to be invalid, illegal or unenforceable, that is not itself invalid, illegal or unenforceable) shall be construed so as to give effect to the intent manifested thereby.

Section 17. Enforcement.

(a) The Company expressly confirms and agrees that it has entered into this Agreement and assumed the obligations imposed on it hereby in order to induce Indemnitee to serve as a director or officer of the Company, and the Company acknowledges that Indemnitee is relying upon this Agreement in serving the Company in such capacity.

(b) This Agreement constitutes the entire agreement between the parties hereto with respect to the subject matter hereof and supersedes all prior agreements and understandings, oral, written and implied, between the parties hereto with respect to the subject matter hereof; provided, however, that this Agreement is a supplement to and in furtherance of the Charter, the Bylaws and applicable law, and shall not be deemed a substitute therefor, nor to diminish or abrogate any rights of Indemnitee thereunder.

Section 18. Modification and Waiver. No supplement, modification or amendment, or waiver of any provision, of this Agreement shall be binding unless executed in writing by the parties thereto. No waiver of any of the provisions of this Agreement shall be deemed or shall constitute a waiver of any other provisions of this Agreement nor shall any waiver constitute a continuing waiver.

Section 19. Notice by Indemnitee. Indemnitee agrees promptly to notify the Company in writing upon being served with any summons, citation, subpoena, complaint, indictment, information or other document relating to any Proceeding or matter which may be subject to indemnification or advancement as provided hereunder. The failure of Indemnitee to so notify the Company shall not relieve the Company of any obligation which it may have to Indemnitee under this Agreement or otherwise.

Section 20. Notices. All notices, requests, demands and other communications under this Agreement shall be in writing and shall be deemed to have been duly given if (a) delivered by hand and receipted for by the party to whom said notice or other communication shall have been directed, (b) mailed by certified or registered mail with postage prepaid, on the third business day after the date on which it is so mailed, or (c) mailed by reputable overnight courier and receipted for by the party to whom said notice or other communication shall have been directed:

(a) If to Indemnitee, at such address as Indemnitee shall provide to the Company.

(b) If to the Company to, at the Company's principal place of business, addressed to the attention of the Corporate Secretary, or to any other address as may have been furnished to Indemnitee by the Company.

Section 21. Contribution. To the fullest extent permissible under applicable law, if the indemnification provided for in this Agreement is unavailable to Indemnitee for any reason whatsoever, the Company, in lieu of indemnifying Indemnitee, shall contribute to the amount incurred by Indemnitee, whether for judgments, fines, penalties, excise taxes, amounts paid or to be paid in settlement and/or for Expenses, in connection with any Proceeding in such proportion as is deemed fair and reasonable in light of all of the circumstances in order to reflect (i) the relative benefits received by the Company and Indemnitee in connection with the event(s) and/or transaction(s) giving rise to such Proceeding; and/or (ii) the relative fault of the Company (and its directors, officers, employees and agents) and Indemnitee in connection with such event(s) and/or transactions.

Section 22. Applicable Law and Consent to Jurisdiction. This Agreement and the legal relations among the parties shall be governed by, and construed and enforced in accordance with, the laws of the State of Delaware, without regard to its conflict of laws rules. Except with respect to any arbitration commenced by Indemnitee pursuant to Section 13(a) of this Agreement, the Company and Indemnitee hereby irrevocably and unconditionally (i) agree that any action or proceeding arising out of or in connection with this Agreement shall be brought only in the Delaware Court, and not in any other state or federal court in the United States of America or any court in any other country, (ii) consent to submit to the exclusive jurisdiction of the Delaware Court for purposes of any action or proceeding arising out of or in connection with this Agreement, (iii) consent to service of process at the address set forth in Section 20 of this Agreement with the same legal force and validity as if served upon such party personally within the State of Delaware, (iv) waive any objection to the laying of venue of any such action or proceeding in the Delaware Court, and (v) waive, and agree not to plead or to make, any claim that any such action or proceeding brought in the Delaware Court has been brought in an improper or inconvenient forum.

Section 23. Identical Counterparts. This Agreement may be executed in one or more counterparts, each of which shall for all purposes be deemed to be an original but all of which together shall constitute one and the same Agreement. Only one such counterpart signed by the party against whom enforceability is sought needs to be produced to evidence the existence of this Agreement.

Section 24. Miscellaneous. The headings of the paragraphs of this Agreement are inserted for convenience only and shall not be deemed to constitute part of this Agreement or to affect the construction thereof.

* * *

IN WITNESS WHEREOF, the parties have caused this Agreement to be signed as of the day and year first above written.

Atossa Therapeutics, Inc.
By: _____
[Name]
[Office]

_____
[Indemnitee]
[Name]

Exhibit 21.1

LIST OF SUBSIDIARIES

Atossa Genetics UK Ltd.
Atossa Genetics AUS Pty Ltd.

Exhibit 23.1

CONSENT OF INDEPENDENT REGISTERED PUBLIC ACCOUNTING FIRM

Atossa Therapeutics, Inc.
Seattle, Washington

We hereby consent to the incorporation by reference in the Registration Statements on Form S-1 (No. 333-250820 and 333-223949), Form S-3 (No. 333-255411, 333-254548, 333-252335, 333-248555, 333-192390 and 333-220572), and Form S-8 (No. 333-254905, 333-185625 and 333-193952) of Atossa Therapeutics, Inc. of our report dated March 22, 2023, relating to the consolidated financial statements of Atossa Therapeutics, Inc., which appears in this Form 10-K.

/s/ BDO USA, LLP

Seattle, Washington
March 22, 2023

Exhibit 31.1

**CERTIFICATION PURSUANT TO RULES 13a-14(a) AND 15d-14(a)
OF THE SECURITIES EXCHANGE ACT OF 1934, AS AMENDED,
AS ADOPTED PURSUANT TO
SECTION 302 OF THE SARBANES-OXLEY ACT OF 2002**

I, Steven C. Quay, certify that:

1. I have reviewed this Annual Report on Form 10K of Atossa Therapeutics, 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 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 22, 2023

/s/Steven C. Quay
Steven C. Quay
Chief Executive Officer and President
(Principal Executive Officer)

Exhibit 31.2

**CERTIFICATION PURSUANT TO RULES 13a-14(a) and 15d-14(2)
OF THE SECURITIES EXCHANGE ACT OF 1934, AS AMENDED,
AS ADOPTED PURSUANT TO
SECTION 302 OF THE SARBANES-OXLEY ACT OF 2002**

I, Kyle Guse, certify that:

1. I have reviewed this Annual Report on Form 10K of Atossa Therapeutics, 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 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 22, 2023

/s/Kyle Guse
Kyle Guse
Chief Financial Officer, General Counsel and Secretary
(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 of Atossa Therapeutics, Inc. (the "Company") on Form 10-K for the period ended December 31, 2022 as filed with the Securities and Exchange Commission on the date hereof (the "Report"), I, Steven C. Quay, Chief Executive Officer and President of the Company, certify, pursuant to 18 U.S.C. §1350, as adopted pursuant to §906 of the Sarbanes-Oxley Act of 2002, that:

(1) The Report fully complies with the requirements of Section 13(a) or 15(d) of the Securities Exchange Act of 1934; and

(2) The information contained in the Report fairly presents, in all material respects, the financial condition and results of operations of the Company.

Date: March 22, 2023

/s/ Steven C. Quay
Steven C. Quay
Chief Executive Officer and President
(Principal Executive Officer)

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 of Atossa Therapeutics, Inc. (the "Company") on Form 10-K for the period ended December 31, 2022 as filed with the Securities and Exchange Commission on the date hereof (the "Report"), I, Kyle Guse, Chief Financial Officer, General Counsel and Secretary of the Company, certify, pursuant to 18 U.S.C. §1350, as adopted pursuant to §906 of the Sarbanes-Oxley Act of 2002, that:

(1) The Report fully complies with the requirements of Section 13(a) or 15(d) of the Securities Exchange Act of 1934; and

(2) The information contained in the Report fairly presents, in all material respects, the financial condition and results of operations of the Company.

Date: March 22, 2023

/s/ Kyle Guse
Kyle Guse
Chief Financial Officer, General Counsel and Secretary
(Principal Financial and Accounting Officer)