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 1-11460

Eterna Therapeutics Inc.

(Exact name of registrant as specified in its charter)

Delaware	**31-1103425**
(State or Other Jurisdiction of Incorporation or Organization)	**(I.R.S. Employer Identification No.)**
10355 Cambridge Street, Suite 18A, Cambridge, MA	**02141**
(Address of Principal Executive Offices)	**(Zip Code)**

(212) 582-1199
(Registrant's telephone number, including Area Code)

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, $0.005 par value	ERNA	The Nasdaq Stock Market LLC

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

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

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

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

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

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

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

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

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

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

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

The aggregate market value of the common stock held by non-affiliates of the registrant as of the last business day of the registrant's most recently completed second fiscal quarter (June 30, 2022), computed by reference to the closing sale price of the common stock on the Nasdaq Stock Market LLC (''Nasdaq'') on such date, was approximately $23.8 million. For purposes of this determination shares beneficially owned by executive officers, directors and ten percent stockholders have been excluded, which does not represent an admission by the registrant as to the affiliate status of such person.

As of March 20, 2023, the registrant had 5,127,070 shares of common stock outstanding.

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CAUTIONARY NOTE REGARDING FORWARD-LOOKING STATEMENTS

This Annual Report on Form 10-K contains ‘‘forward-looking statements’’ as that term is defined under the Private Securities Litigation Reform Act of 1995 (‘‘PSLRA’’), 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’’). Forward-looking statements include statements related to future events, results, performance, prospects and opportunities, including statements related to our strategic plans and targets, revenue generation, product availability and offerings, capital needs, capital expenditures, industry trends and our financial position. Forward-looking statements are based on information currently available to us, on our current expectations, estimates, forecasts, and projections about the industries in which we operate and on the beliefs and assumptions of management. Forward looking statements often contain words such as ‘‘expects,’’ ‘‘anticipates,’’ ‘‘could,’’ ‘‘targets,’’ ‘‘projects,’’ ‘‘intends,’’ ‘‘plans,’’ ‘‘believes,’’ ‘‘seeks,’’ ‘‘estimates,’’ ‘‘may,’’ ‘‘will,’’ ‘‘would,’’ and similar expressions. In addition, any statements that refer to projections of our future financial performance, our anticipated growth and trends in our business, and other characterizations of future events or circumstances, are forward-looking statements. Forward-looking statements by their nature address matters that are, to different degrees, subject to risks and uncertainties that could cause actual results to differ materially and adversely from those expressed in any forward-looking statements. For us, particular factors that might cause or contribute to such differences include those identified in the ‘‘Summary of Principal Risk Factors’’ below and the other risks and uncertainties described in Part I, Item 1A ‘‘Risk Factors’’ of this Annual Report on Form 10-K and described in other documents we file from time to time with the Securities and Exchange Commission, or SEC, including our Quarterly Reports on Form 10-Q.

Readers are urged not to place undue reliance on the forward-looking statements in this Annual Report on Form 10-K, which speak only as of the date of this Annual Report on Form 10-K. We are including this cautionary note to make applicable, and take advantage of, the safe harbor provisions of the PSLRA. Except as required by law, we do not undertake, and expressly disclaim any obligation, to disseminate, after the date hereof, any updates or revisions to any such forward-looking statements to reflect any change in expectations or events, conditions or circumstances on which any such statements are based.

We believe that the expectations reflected in forward-looking statements in this Annual Report on Form 10-K are based upon reasonable assumptions at the time made. However, given the risks and uncertainties, you should not rely on any forward- looking statements as a prediction of actual results, developments or other outcomes. You should read these forward-looking statements with the understanding that we may be unable to achieve projected results, developments or other outcomes and that actual results, developments or other outcomes may be materially different from what we expect.

On October 11, 2022 we changed our name from Brooklyn ImmunoTherapeutics, Inc. to Eterna Therapeutics Inc. upon our filing with the Secretary of State of the State of Delaware a Certificate of Amendment to our Restated Certificate of Incorporation, as amended. On December 20, 2022, we changed the name of one of our subsidiaries from Brooklyn ImmunoTherapeutics, LLC to Eterna Therapeutics LLC. Unless stated otherwise or the context otherwise requires, all references in this Annual Report on Form 10-K to ‘‘Eterna’’ refer to Eterna Therapeutics Inc., references to ‘‘Eterna LLC’’ refer to Eterna Therapeutics LLC, and references to the ‘‘Company,’’ ‘‘we,’’ ‘‘us’’ or ‘‘our’’ refer to Eterna and its consolidated subsidiaries, including Eterna LLC, Novellus, Inc. and Novellus Therapeutics Limited.

SUMMARY OF PRINCIPAL RISK FACTORS

You should carefully consider the summary of principal risk factors below, together with the more detailed risk factors related to our business and industry described under ‘‘Risk Factors’’ contained in Item 1A of this Annual Report on Form 10-K. The occurrence of any of the events discussed below could significantly and adversely affect our business, prospects, results of operations, financial condition, and cash flows, which could result in a decline in the market price of our common stock.

- We are substantially dependent on intellectual property we in-licensed from Factor Limited, and expect in the future to continue to depend on in-licensed technology, and if we lose the license to such intellectual property or the Exclusive Factor License Agreement is terminated for any reason, our ability to enter into strategic partnerships or develop therapeutics products would be harmed.
- We may not realize the benefits of strategic partnerships that we may form in the future or of potential future product acquisitions of licenses.
- We or our licensors may be subject to claims challenging the inventorship or ownership of the patents and other intellectual property that we own or license now or in the future.
- The failure of our licensees to fulfill their financial obligations with respect to royalty payments under their license agreements or to otherwise perform under their license agreement could have a material adverse effect on our business, financial condition and results of operations.
- If conflicts arise between us and our future strategic partners or collaborators, these parties may act in a manner adverse to us and could limit our ability to implement our strategies
- We expect to incur significant losses for the foreseeable future and may never achieve or maintain profitability.
- We will require substantial additional capital to fund our operations, and if we fail to obtain the necessary financing, we may not be able to pursue our business strategy.
- We may face business disruption and related risks resulting from a resurgence of the novel coronavirus (COVID-19) pandemic, or other similar event, which could have a material adverse effect on our business plan.
- Our business and operations would suffer in the event of system failures, cyber-attacks or a deficiency in our cyber-security.
- If we fail to comply with applicable laws and regulations, we could become subject to fines or penalties or incur costs that could harm our business.
- If we are not successful in attracting and retaining highly qualified personnel, we may not be able to successfully implement our business strategy.
- If we are unable to obtain and maintain patent and other intellectual property protection, or if the scope of the patent and other intellectual property protection obtained is not sufficiently broad, our competitors could develop and commercialize products similar or identical to those derived from our intellectual property, and our ability to achieve profitability may be adversely affected.

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PART I

ITEM 1. Business

About Eterna

We are a preclinical-stage biopharmaceutical company committed to realizing the potential of mRNA cell engineering to provide patients with transformational new medicines. We have in-licensed a portfolio of over 100 patents covering key mRNA cell engineering technologies, including technologies for mRNA cell reprogramming, mRNA gene editing, the NoveSlice™ and UltraSlice™ gene-editing proteins, and the ToRNAdo™ mRNA delivery system, which we collectively refer to as our ''mRNA technology platform.'' We plan to develop and advance a pipeline of therapeutic products, both internally and through strategic partnerships, with the near-term focus on deploying our mRNA technology platform through strategic partnerships. We license our mRNA technology platform from Factor Bioscience Limited (''Factor Limited'') under an exclusive license agreement.

Background

Merger with NTN Buzztime, Inc.

On August 12, 2020, Eterna (then known as NTN Buzztime, Inc.), Eterna LLC (then known as Brooklyn Immunotherapeutics LLC) and BIT Merger Sub, Inc., a wholly owned subsidiary of Eterna (''Merger Sub''), entered into an agreement and plan of merger and reorganization (the ''Merger Agreement''), pursuant to which, among other matters, Merger Sub merged with and into Eterna LLC, with Eterna LLC surviving the merger as a wholly owned subsidiary of Eterna (the ''Merger''). The Merger closed on March 25, 2021. The Merger was accounted for as a reverse acquisition, in which Eterna LLC was deemed the acquiring company for accounting purposes. In March 2021, we sold the NTN Buzztime legacy assets to a third party (the ''Disposition'').

Acquisition of Novellus

On July 16, 2021, we completed the acquisition (the ''Novellus Acquisition'') of Novellus, Inc. (''Novellus'') and its subsidiary, Novellus Therapeutics Limited (''Novellus Limited''). At the time of the acquisition, Novellus was focused on the development of next-generation engineered mesenchymal stem cell therapies using mRNA-based cell reprogramming and gene editing technologies licensed from Factor Bioscience. As part of the Novellus Acquisition, we also acquired 25.0% of the total outstanding equity interests of NoveCite, Inc. (''NoveCite''), a corporation focused on developing an allogeneic mesenchymal stem cell product for patients with acute respiratory distress syndrome (''ARDS''), including from COVID-19.

Principal Executive Offices

Our principal executive offices are located at 1035 Cambridge Street, Suite 18A, Cambridge, Massachusetts 02141, and our phone number is (212) 582-1199. We maintain a website at www.eternatx.com. Information contained on, or accessible through, our website is not a part of and is not incorporated by reference into this Annual Report on Form 10-K.

Recent Developments

Cell Line Customization and License Agreement

On February 21, 2023, we entered into a cell line customization and license agreement (the ''Lineage Agreement'') with Lineage Cell Therapeutics, Inc. (''Lineage''), pursuant to which, Lineage may request prior to August 22, 2023 that we develop for, and deliver to, Lineage certain induced pluripotent stem cell lines, which Lineage would use to evaluate the possible development of cell transplant therapies for treatment of diseases of the central nervous system in humans, (a) excluding ophthalmologic indications, (b) diseases and conditions of the peripheral nervous system, (c) psychiatric, respiratory, musculoskeletal, and hematological diseases, disorders, and conditions, and (d) cancer. The Lineage Agreement also provides Lineage with the option to obtain an exclusive sublicense to certain related technology for preclinical, clinical and commercial purposes, which would permit Lineage to sublicense such intellectual property, subject to payment of certain sublicense royalty fees. Lineage has six months from our delivery to Lineage of such induced pluripotent stem cell lines to exercise such option, and upon any such exercise, Lineage would agree to use its commercially reasonable efforts to exploit and make commercially available one or more licensed products derived from such induced pluripotent stem cell lines in accordance with the

Lineage Agreement. Upon entry into the Lineage Agreement, Lineage paid us a $250,000 non-refundable up-front payment. We are also entitled to certain cell line customization fees with respect to cell lines that Lineage may request that we develop for Lineage, as well as royalty payments with respect to any such licensed products, certain sublicense fees and certain milestone payments under the Lineage Agreement.

Name and Ticker Symbol Changes and Nasdaq Listing Change

On October 17, 2022, we changed our name from Brooklyn ImmunoTherapeutics, Inc. to Eterna Therapeutics Inc., and the trading symbol of our common stock on The Nasdaq Global Market changed from ''BTX'' to ''ERNA.'' On January 11, 2023, we transferred the listing of our common stock from The Nasdaq Global Market to the Nasdaq Capital Market, on which our common stock continues to trade under the trading symbol ''ERNA''.

Reverse Stock Split

Effective at 11:59 p.m. Eastern time on October 16, 2022, we effected a reverse stock split of our common stock at a ratio of 1-for-20 (the ''Reverse Stock Split''). Upon the effectiveness of the Reverse Stock Split, every twenty shares of the issued and outstanding common stock were automatically combined and reclassified into one issued and outstanding share of common stock. The Reverse Stock Split did not affect any stockholder's ownership percentage of the common stock, alter the par value of the common stock or modify any voting rights or other terms of the common stock. The number of authorized shares of common stock under our Charter remains unchanged. No fractional shares were issued in connection with the Reverse Stock Split. In lieu of any fractional shares to which a stockholder would otherwise be entitled, we paid an amount of cash equal to the product of (i) the fractional share to which the holder would otherwise be entitled and (ii) the then fair value of a share as determined in good faith by our Board of Directors. We paid an aggregate of $719 for a total of 175 fractional shares.

All share and per share data in this Annual Report on Form 10-K have been adjusted for all periods presented to reflect the Reverse Stock Split.

Overview

mRNA, Gene-Editing, and Cellular Medicines

We are a preclinical-stage biopharmaceutical company committed to realizing the potential of mRNA cell engineering to provide patients with transformational new medicines. We have in-licensed a portfolio of over 100 patents covering key mRNA cell engineering technologies, including technologies for mRNA cell reprogramming, mRNA gene editing, the NoveSlice™ and UltraSlice™ gene-editing proteins, and the ToRNAdo™ mRNA delivery system, which we collectively refer to as our ''mRNA technology platform.'' We plan to develop and advance a pipeline of therapeutic products both internally and through strategic partnerships, with the near-term focus on deploying our mRNA technology platform through strategic partnerships. We license our mRNA technology platform from Factor Limited under an exclusive license agreement.

Through strategic partnerships, we expect that our mRNA technology platform will be used for preclinical and eventual clinical development of product candidates for a variety of clinical indications. We expect that the initial product candidates developed by our strategic partners utilizing our mRNA technology platform will include hypoimmune induced pluripotent stem cell (''iPSC'')-derived product candidates for the treatment of neurological indications and iPSC-derived immune-modulating cells (''iIMCs'') for indications such as acute myeloid leukemia (''AML'') and solid tumors.

We refer to aspects of our mRNA technology platform as ''mRNA delivery,'' ''mRNA gene editing'' and ''mRNA cell reprogramming.''

mRNA Delivery

Nucleic acids, such as mRNA, can be used to induce cells to express desired proteins, including proteins that are capable of re-writing genetic and epigenetic cellular programs. However, the plasma membrane surrounding cells normally protects cells from exogenous nucleic acids, preventing efficient uptake and protein translation. Delivery systems can be used to enhance the uptake of nucleic acids by cells. Conventional delivery systems, such as lipid nanoparticle (''LNP'')-based delivery, often suffer from endosomal entrapment and toxicity, which can limit their therapeutic use. Our mRNA delivery technology is designed to use a novel chemical substance that is designed to deliver nucleic acids, including mRNA, to cells both *ex vivo* and *in vivo*. Our nucleic-acid delivery technology is also

designed for *ex vivo* delivery of mRNA encoding gene-editing proteins and reprogramming factors, including to primary cells, insertion of exogenous sequences into genomic safe-harbor loci, and *in vivo* delivery of mRNA to the brain, eye, skin, and lung, which may be useful for the development of mRNA-based therapeutic.

mRNA Gene Editing

Our mRNA gene-editing technology is designed to delete, insert, and repair DNA sequences in living cells, which may be useful for correcting disease-causing mutations, making cells resistant to infection and degenerative disease, modulating the expression of immunoregulatory proteins to enable the generation of durable allogeneic cell therapies, and engineering immune cells to more effectively fight cancer.

Conventional gene-editing technologies typically employ plasmids or viruses to express gene-editing proteins, which can result in low-efficiency editing and unwanted mutagenesis when an exogenous nucleic acid fragment is inserted at random locations in the genome. Our mRNA gene-editing technology instead is designed to employ mRNA to express gene-editing proteins, which can potentially enable gene editing without unwanted insertional mutagenesis, because, unlike conventional gene-editing technologies that employ viruses or DNA-based vectors, mRNA does not typically cause unwanted insertional mutagenesis. We believe the efficiency of our mRNA gene-editing technology has the potential to support development of product candidates that could create new therapeutic approaches. For example, we anticipate that our mRNA gene-editing technology can be used to generate allogeneic chimeric antigen receptor T-cell (''CAR-T'') therapies for the treatment of cancer. In such allogeneic CAR-T therapies, mRNA encoding gene-editing proteins would be used to inactivate the endogenous T-cell receptor to prevent therapeutic T-cells from causing graft-versus-host disease (''GvHD''). GvHD occurs when transplanted cells view the patient's (i.e. the host's) cells as a threat and attack the host's cells. We expect that this same mechanism of action can generate allogeneic stem cell-derived therapies in which mRNA encoding gene-editing proteins could be used to inactivate one or more components of the human leukocyte antigen (''HLA'') complex to render the cells immuno-nonreactive or ''stealth,'' which may be useful for the development of allogeneic cell-based therapies.

mRNA Cell Reprogramming

Our mRNA cell-reprogramming technology is capable of generating clonal lines of pluripotent stem cells that can be expanded and differentiated into many desired cell types that may be useful for the development of regenerative cell therapies.

Conventional cell-reprogramming technologies (e.g., using Sendai virus or episomal vectors) can result in low efficiency reprogramming, can select for cells with abnormal growth characteristics, and can leave traces of the vector in reprogrammed cells. Our mRNA cell-reprogramming technology instead is designed to employ mRNA to express reprogramming factors, which can enable cell reprogramming without leaving traces of the vector in reprogrammed cells, because, unlike conventional cell-reprogramming technologies that employ viruses or DNA-based vectors, mRNA does not typically leave traces of the vector in reprogrammed cells.

IRX-2

IRX-2, our former clinical product candidate, is a mixed, human-derived cytokine product with multiple active constituents, including Interleukin-2, or IL2, and other key cytokines. Together, these cytokines are believed to signal, enhance and restore immune function suppressed by the tumor, thus enabling the immune system to attack cancer cells, unlike many existing cancer therapies, which rely on targeting the cancer directly. IRX-2 is prepared from the supernatant of pooled allogeneic peripheral blood mononuclear cells, known as PBMCs, that have been stimulated using a proprietary process employing a specific population of cells and a specific mitogen.

We currently do not have plans to further develop the IRX-2 product candidate. Results of the 150-patient Phase 2b INSPIRE trial (the ''INSPIRE trial''), released in June 2022, showed outcomes favored IRX-2 in certain predefined subgroups but the INSPIRE trial did not meet the primary endpoint of event-free survival at two years of follow up. There were no new safety signals observed with IRX-2.

The INSPIRE trial was the only Company-sponsored study of IRX-2. IRX-2 has been studied externally in other clinical settings outside of head and neck cancer in the form of investigator sponsored trials, all of which have either ended or are not currently active. We had previously provided IRX-2 as a study drug and financial support to conduct those investigator sponsored trials, but are no longer providing either.

License and Royalty Agreements

Cell and Gene Therapy License Agreements

Exclusive Factor License Agreement

In November 2020, Novellus Limited and Factor Limited entered into a license agreement (the ''Novellus-Factor License Agreement''), pursuant to which Factor Limited granted to Novellus Limited an exclusive license to certain patents owned by Factor Limited for the development of certain stem cell-based cellular therapies for treating diseases and conditions in humans and animals.

In April 2021, Eterna LLC, Novellus Limited and Factor Limited entered into an exclusive license agreement (the ''Original Factor License Agreement''), pursuant to which Eterna LLC acquired an exclusive worldwide license to intellectual property and mRNA cell reprogramming and gene editing technology for use in the development of certain mRNA, gene-editing, and cellular therapies to be evaluated and developed for treating human diseases, including certain types of cancer, sickle cell disease, and beta thalassemia.

As a result of the Novellus Acquisition, the rights and obligations of Novellus Limited under the Novellus-Factor License Agreement pertaining to any and all licensed products from Factor Limited inured to Eterna, and the Original Factor License Agreement remained unchanged.

In November 2022, following the expiration of one of the delineated milestone deadlines for certain regulatory filings required under the Novellus-Factor License Agreement, which permitted Factor Limited to terminate the license granted to Novellus Limited thereunder, we entered into the first amendment to the Original Factor License Agreement (the ''Amended Factor License Agreement''), pursuant to which, among other things, Factor Limited granted to Eterna LLC an exclusive, sublicensable license under certain patents owned by Factor Limited (the ''Factor Patents'') for the purpose of identifying and pursuing certain opportunities to grant to third parties sublicenses to the Factor Patents. The Amended Factor License Agreement also (i) terminated the Novellus-Factor License Agreement, (ii) confirmed Factor Limited's grant to Eterna LLC of the rights and licenses Novellus Limited previously granted to Eterna LLC under the Novellus-Factor License Agreement on the same terms and conditions as granted by Novellus Limited to Eterna LLC under such agreement, (iii) confirmed that the sublicense granted by Novellus Limited in accordance with the Novellus-Factor License Agreement to NoveCite (as discussed below), survived termination of the Novellus-Factor License Agreement and (iv) removed Novellus Limited from the Amended Factor License Agreement and the NoveCite Agreement and replaced Novellus Limited with Factor Limited as the direct licensor to Eterna LLC and NoveCite under such agreements, respectively.

On February 20, 2023, we and Factor Limited entered into an exclusive license agreement (the ''Exclusive Factor License Agreement''), which terminated and replaced in its entirety the Amended Factor License Agreement. Subject to certain exclusive licenses or other rights granted by Factor Limited to certain third parties as of the effective date of the Exclusive Factor License Agreement, Factor granted us the exclusive, sublicensable license under the Factor Patents.

The term of the Exclusive Factor License Agreement expires on November 22, 2027, but will be automatically extended for an additional two and a half years (such period, the ''Renewal Term'') if we receive at least $100 million in fees from sublicenses to the Factor Patents (''Sublicense Fees'') granted by us pursuant to the Exclusive Factor License Agreement. Pursuant to the Exclusive Factor License Agreement, we will pay to Factor 20% of any Sublicense Fee received by us before the initial expiration date of such license and 30% of any Sublicense Fees received by us during the Renewal Term. We may terminate the Exclusive Factor License Agreement upon 120 days' written notice to Factor, and both parties otherwise have additional customary termination rights, including in connection with certain uncured material breaches of the Exclusive Factor License Agreement and specified bankruptcy events. Under the Exclusive Factor License Agreement, we are obligated to pay the expenses incurred by Factor Limited in preparing, filing, prosecuting and maintaining the Factor Patents and agreed to bear all costs and expenses associated with enforcing and defending the Factor Patents in any action or proceeding arising from pursuit of sublicensing opportunities under the license granted under the Exclusive Factor License Agreement.

There can be no assurance that we can successfully develop and commercialize the technology licensed under the Exclusive Factor License Agreement. See Item 1A ''Risk Factors—Risks Related to our Business and Industry—We depend substantially, and expect in the future to continue to depend, on in-licensed intellectual property. Such licenses impose obligations on our business, and if we fail to comply with those obligations, we could lose license rights, which would substantially harm our business'' contained in this Annual Report on Form 10-K.

NoveCite

In October 2020, Novellus Limited (as sublicensor) and NoveCite (as sublicensee) entered into an exclusive license agreement (the ''NoveCite Agreement'') to license a novel cellular therapy for acute respiratory indications, which Novellus Limited was licensing from Factor Limited under the Novellus-Factor License Agreement. As discussed above, as a result of the Amended Factor License Agreement and the termination of the Novellus-Factor License Agreement, the NoveCite Agreement was amended to remove Novellus Limited as sublicensor and create a direct license between Factor Limited and NoveCite effective November 1, 2022.

IRX-2 License Agreements

Unless otherwise stated below, each royalty to be paid under these license and royalty agreements is payable until the last patent for IRX-2 expires and runs in perpetuity unless earlier terminated pursuant to the terms described below. There are no milestone payments due under any of these agreements. While the licenses described below remain in force, we currently do not have plans to further develop the IRX-2 product candidate.

License Agreement with the University of South Florida Research Association

On June 28, 2000, IRX Therapeutics, a predecessor of Eterna LLC, entered into a series of License Agreements (collectively, as amended, the ''USF License Agreement'') with the University of South Florida Research Association, Inc. (''Research Association''). Pursuant to the USF License Agreement, the Research Association licensed to IRX Therapeutics the exclusive worldwide rights to certain patents on IRX-2 in exchange for royalties equal to 7% of the gross product sales of IRX-2. The USF License Agreement was assigned to Eterna LLC in connection with the sale of the assets of IRX Therapeutics to Eterna LLC in November 2018.

Royalty Agreement with certain former IRX Therapeutics investors

On May 1, 2012, IRX Therapeutics entered into a royalty agreement (the ''IRX Investor Royalty Agreement'') with certain investors who participated in a financing transaction. The IRX Investor Royalty Agreement was assigned to Eterna LLC in November 2018 when Eterna LLC acquired the assets of IRX Therapeutics. Pursuant to the IRX Investor Royalty Agreement, if and when Eterna LLC becomes obligated to pay royalties to the Research Association under the USF License Agreement, it will pay an additional royalty of 1% of gross sales to an entity organized by the investors who participated in such financing transaction.

Collaborator License Agreement

Effective June 28, 2018, IRX Therapeutics terminated its Research, Development and Option Facilitation Agreement and certain related agreements with a collaborative partner (the ''Collaborator''), pursuant to a termination agreement (the ''Termination Agreement''). The Termination Agreement was assigned to Eterna LLC in connection with the sale of the assets of IRX Therapeutics to Eterna LLC in November 2018. As consideration for entering into the Termination Agreement, the Collaborator is entitled to receive a royalty equal to 6% of revenues from the sale of IRX-2, for the period of time beginning with the first sale of IRX-2 through the later of (i) the twelfth anniversary of the first sale of IRX-2, or (ii) the expiration of the last IRX patent or other exclusivity of IRX-2.

Investor Royalty Agreement

On November 6, 2018, Eterna LLC entered into a royalty agreement, as amended (the ''Royalty Agreement'') with Brooklyn Immunotherapeutics Investors LP (''Investors LP'') and Brooklyn Immunotherapeutics Investors GP (''Investors GP''), and certain beneficial holders of Investors LP and Investors GP, which entities provided the financing required by Eterna LLC in connection with Eterna LLC's acquisition of the assets of IRX Therapeutics. Under the Royalty Agreement, Eterna LLC is required to pay royalties to Investors LP, Investors GP and such beneficial holders based on gross sales of IRX-2. This royalty continues in perpetuity. The Royalty Agreement specifies royalty payments to certain beneficial holders, including Charles Cherington and Nicholas J. Singer, who are both current directors and stockholders of Eterna; however, we have not paid and, because we are no longer pursuing the development of IRX-2, we do not expect to pay, any such royalties.

Patent Portfolio

Cell and Gene Therapy

Our strategy is to develop and advance a pipeline of therapeutic products both internally and through strategic partnerships, leveraging our in-licensed mRNA technology platform, with the near-term focus on deploying our mRNA technology platform through strategic partnerships. As of March 20, 2023, we had in-licensed approximately

12 patent families filed in the United States and other major markets worldwide, including 125 granted patents, 9 allowed patent applications, 64 published patent applications, 25 pending, unpublished non-provisional patent applications, and 2 published, pre-nationalization PCT applications. Patent protection for the mRNA technology platform includes:

Family Number and Title	United States or Foreign Jurisdiction	Earliest Effective Date of Patent Application
FAB-001: ''Methods and Products for Transfecting Cells''	**Granted**: US (Nos. 9,422,577, 9,605,277, 9,605,278, 10,472,611, 10,662,410, 10,829,738, 10,982,229, and 11,466,293), EP (CH, DE, FR, GB, IE), EP (BE, CH, DE, DK, FR, GB, IE, NL), AU (6X), CA (Allowed), CN (4X), HK (5X), JP (2X), KR (2X), MX, MX (Allowed), RU (2X) **Published**: US (3X), EP, BR (2X), CA, CN, HK (2X), KR, RU **Pending**: US (4X), AU, CA, MX (3X)	12/05/2011
FAB-003: ''Methods and Products for Transfection''	**Granted**: US (Nos. 8,497,124, 9,127,248, 9,399,761, 9,562,218, 9,695,401, 9,879,228, 9,969,983, 10,131,882, 10,301,599, 10,443,045, 11,492,600) **Pending**: US	12/05/2011
FAB-005: ''Methods and Products for Expressing Proteins in Cells''	**Granted**: US (Nos. 9,376,669, 9,447,395, 9,464,285, 9,487,768, 9,657,282, 9,758,797, 10,415,060, 10,590,437, 10,724,053, 10,752,917, 10,752,918, 10,752,919, 10,767,195, 11,332,758, 11,332,759, 11,339,409, and 11,339,410), EP (CH, DE, FR, GB, IE), AU (2X), BR (3X Allowed), CA (Allowed), HK, JP (3X), KR (2X), MX, RU **Published**: US (2X), EP, BR, CA, CN, HK, JP, KR, MX **Pending**: AU	11/01/2012
FAB-008: ''Methods and Products for Nucleic Acid Production and Delivery''	**Granted**: US (Nos. 9,770,489 and 10,124,042), EP (CH, DE, ES, FR, IE), EP (BE, CH, DE, DK, ES, FI, FR, GB, IE, NL, NO, SE), AU, CA (Allowed), HK, JP (Allowed), KR, MX **Published**: US (2X), AU, BR (2X), CA, CN, JP, KR, MX **Pending**: AU, EP	08/18/2014
FAB-009: ''Nucleic Acid Products and Methods of Administration Thereof''	**Granted**: US (No. 11,241,505), AU, JP **Published**: US, EP, CA, CN, HK (2X), JP, NZ **Pending**: AU	02/13/2015
FAB-010: ''Nucleic Acid Products and Methods of Administration Thereof''	**Granted**: US (Nos. 10,137,206, 10,350,304, 10,363,321, 10,369,233, 10,576,167, 10,888,627, and 10,894,092), CN (Allowed) **Published**: US (3X), EP, AU, CA, CN, HK, JP, IL, IN, NZ **Pending**: CN, JP (2X), NZ	08/17/2016

Family Number and Title	United States or Foreign Jurisdiction	Earliest Effective Date of Patent Application
FAB-011: ‘‘Nucleic Acid-Based Therapeutics’’	**Published**: US, EP, AU, CA, HK	03/27/2018
FAB-012: ‘‘Cationic Lipids and Transfection Methods’’	**Granted**: US (Nos. 10,501,404, 10,556,855, 10,611,722, 10,752,576, and 11,242,311) **Published**: US (2X), AU, CA, CN, EP, HK, JP, KR, MX **Pending**: AU, NZ	US: 07/30/2019 Foreign: 07/03/2019
FAB-013: ‘‘Engineered Gene-Editing Proteins’’	**Pending**: US, EP	05/12/2020
FAB-016: ‘‘Mesenchymal Stem Cell Therapies’’	**Published**: CN, EP **Pending**: US, AU, JP	04/28/2020
FAB-017: ‘‘Engineered Immune Cell Therapies’’	**Published**: PCT	03/05/2021
FAB-018: ‘‘Circular RNA’’	**Published**: PCT	04/27/2021

US – United States of America
EP – European Patent Convention
PCT – Patent Cooperation Treaty
AU – Australia
BE – Belgium
BR – Brazil
CA – Canada
CH – Switzerland
CN – Peoples’ Republic of China
DE – Germany
DK – Denmark
ES – Spain
FI – Finland
GB – Great Britain
HK – Hong Kong
IE – Ireland
IL – Israel
IN – India
JP – Japan
KR – Republic of Korea (South Korea)
MX – Mexico
NL – Netherlands
NO – Norway
NZ – New Zealand
SE – Sweden

Patent Families

Descriptions of our patent families are as follows:

- FAB-001: ''Methods and Products for Transfecting Cells'' - The present invention relates in part to nucleic acids encoding proteins, nucleic acids containing non-canonical nucleotides, therapeutics comprising nucleic acids, methods, kits, and devices for inducing cells to express proteins, methods, kits, and devices for transfecting, gene editing, and reprogramming cells, and cells, organisms, and therapeutics produced using these methods, kits, and devices. Methods for inducing cells to express proteins and for reprogramming and gene-editing cells using RNA are disclosed. Methods for producing cells from patient samples, cells produced using these methods, and therapeutics comprising cells produced using these methods are also disclosed.
- FAB-003: ''Methods and Products for Transfection'' - The present invention relates in part to methods for producing tissue-specific cells from patient samples, and to tissue-specific cells produced using these methods. Methods for reprogramming cells using RNA are disclosed. Therapeutics comprising cells produced using these methods are also disclosed.
- FAB-005: ''Methods and Products for Expressing Proteins in Cells'' - The present invention relates in part to nucleic acids encoding proteins, therapeutics comprising nucleic acids encoding proteins, methods for inducing cells to express proteins using nucleic acids, methods, kits and devices for transfecting, gene editing, and reprogramming cells, and cells, organisms, and therapeutics produced using these methods, kits, and devices. Methods and products for altering the DNA sequence of a cell are described, as are methods and products for inducing cells to express proteins using synthetic RNA molecules. Therapeutics comprising nucleic acids encoding gene-editing proteins are also described.
- FAB-008: ''Methods and Products for Nucleic Acid Production and Delivery'' - The present invention relates in part to nucleic acids, including nucleic acids encoding proteins, therapeutics and cosmetics comprising nucleic acids, methods for delivering nucleic acids to cells, tissues, organs, and patients, methods for inducing cells to express proteins using nucleic acids, methods, kits and devices for transfecting, gene editing, and reprogramming cells, and cells, organisms, therapeutics, and cosmetics produced using these methods, kits, and devices. Methods and products for altering the DNA sequence of a cell are described, as are methods and products for inducing cells to express proteins using synthetic RNA molecules, including cells present in vivo. Therapeutics comprising nucleic acids encoding gene-editing proteins are also described.
- FAB-009: ''Nucleic Acid Products and Methods of Administration Thereof'' - The present invention relates in part to nucleic acids, including nucleic acids encoding proteins, therapeutics and cosmetics comprising nucleic acids, methods for delivering nucleic acids to cells, tissues, organs, and patients, methods for inducing cells to express proteins using nucleic acids, methods, kits and devices for transfecting, gene editing, and reprogramming cells, and cells, organisms, therapeutics, and cosmetics produced using these methods, kits, and devices.
- FAB-010: ''Nucleic Acid Products and Methods of Administration Thereof'' - The present invention relates in part to nucleic acids, including nucleic acids encoding proteins, therapeutics and cosmetics comprising nucleic acids, methods for delivering nucleic acids to cells, tissues, organs, and patients, methods for inducing cells to express proteins using nucleic acids, methods, kits and devices for transfecting, gene editing, and reprogramming cells, and cells, organisms, therapeutics, and cosmetics produced using these methods, kits, and devices.
- FAB-011: ''Nucleic Acid-Based Therapeutics'' - The present invention relates in part to nucleic acids, including nucleic acids encoding proteins, therapeutics and cosmetics comprising nucleic acids, methods for delivering nucleic acids to cells, tissues, organs, and patients, methods for inducing cells to express proteins using nucleic acids, methods, kits and devices for transfecting, gene editing, and reprogramming cells, and cells, organisms, therapeutics, and cosmetics produced using these methods, kits, and devices.
- FAB-012: ''Cationic Lipids and Transfection Methods'' - The present invention relates in part to novel cationic lipids and their use, e.g., in delivering nucleic acids to cells.
- FAB-013: ''Engineered Gene-Editing Proteins'' - The present invention relates in part to nucleic acids encoding gene editing proteins, including novel engineered variants.

- FAB-016: ‘‘Mesenchymal Stem Cell Therapies’’ - Cell-based therapies based on mesenchymal stem cells (MSCs) are described.
- FAB-017: ‘‘Engineered Immune Cell Therapies’’ - The present disclosure relates in part to engineered immune cells that are, inter alia, silenced from a host immune response.
- FAB-018: ‘‘Circular RNA’’ - Nucleic acid structures that promote formation of circular RNAs (circRNAs), which may comprise hybridization of substantially complimentary regions within the nucleic acid and contact with an RNA ligase. The nucleic acid structures may be used in gene editing and/or therapeutic applications. In some embodiments, the nucleic acid comprises the structure: 5’-X-Y-A-IRES-B-CDS-C-Y’-Z-3’, wherein X, Y, Y’ and Z each independently comprise one or more nucleotides; Y and Y’ are substantially complementary; X and Z are not substantially complementary; IRES comprises an internal ribosome entry site; CDS comprises a coding sequence; and A, B, and C are each independently a spacer comprising one or more nucleotides or null.

IRX-2

As of March 20, 2023, we owned or controlled approximately 10 patent families filed in the United States and other major markets worldwide related to IRX-2, including 94 granted, 12 pending and 6 published patent applications, directed to novel compounds, formulations, methods of treatments and platform technologies. Patent protection for IRX-2 includes:

Summary Description of Patent or Patent Application	United States or Foreign Jurisdiction	Anticipated Expiration Date of Patent Application
IRX-2 Modified Manufacturing Process	**Granted:** US (No. 8,470,562), EP (BE, CH, DE, DK, ES, FI, FR, GB, IT, LI, NL, SW), AU, CA, JP, MX, TR	US: 04/14/2029 All Others: 04/14/2029
Method of Reversing Immune Suppression of Langerhans Cells	**Granted**: US (Nos. 9,333,238 and 9,931,378), EP (BE, CH, DE, DK, ES, FI, FR, GB, LI, NL), AU, CA JP, CN, HK	US: 12/30/2030 (No. 9,333,238), 12/08/2030 (No. 9,931,378) All Others: 12/8/2030
Method of Increasing Immunological Effect	**Granted**: US (Nos. 7,993,660 and 8,591,956), EP (BE, CH, DE, DK, ES, FI, FR, GB, IT, LI, NL), AU, CA, JP, HK	US: 12/11/2028 (No. 7,993,660), 11/26/2028 (No. 8,591,956) All Others: 11/26/2028
Vaccine Immunotherapy	**Granted:** US (Nos. 9,539,320 and 9,566,331), EP (BE, CH, DE, DK, ES, FI, FR, GB, IT, LI, NL), AU, CA, HK, JP	US: 05/17/2030 (No. 9,539,230), 09/04/2030 (No. 9,566,331). All Others: 5/17/2030
Vaccine Immunotherapy	**Granted:** US (Nos. 9,492,517, 9,492,519), JP, CA, AU **Pending:** EP, HK	US: 02/25/2024 (No. 9,492,517), 06/30/2023 (No. 9,492,519) All Others: 7/24/2027
Immunotherapy for Reversing Immune Suppression	**Granted**: US (No. 7,731,945)	US: 02/06/2025

Summary Description of Patent or Patent Application	United States or Foreign Jurisdiction	Anticipated Expiration Date of Patent Application
Vaccine Immunotherapy for Immune Suppressed Patients	**Granted**: US (Patent Nos. 6,977,072, 9,789,172 and 9,789,173)	US: 04/14/2023 (No. 6,977,072), 08/17/2023 (Nos. 9,789,172 and 9,789,173)
Immunotherapy for Immune Suppressed Patients	**Granted**: EP (BE, CH, DE, ES, FR, GB, IT, NL, LI)	All Others: 3/9/2027
Composition for the Treatment of Advanced Prostate Cancer	**Granted**: CA	7/24/2027
Uses of PD-1/PD-L1 Inhibitors and/or CTLA-4 Inhibitors with a Biologic Containing Multiple Cytokine Components to Treat Cancer	**Granted:** ZA **Pending**: AU, CA, EP, IL, JP, KR, NZ, PH, SG, US (16/326,611) **Published**: BR, CN, EA, IN, MX, ZA	US:8/18/2037* Subject to potential PTA All Other: 8/18/2037

US – United States of America
EP – European Patent Convention
BE – Belgium
CH – Switzerland
DE – Germany
DK – Denmark
ES – Spain
FI – Finland
GB – Great Britain
IT – Italy
LI – Lichtenstein
NL – Netherlands
SW – Sweden
AU – Australia
BR – Brazil
CA – Canada
CN – Peoples' Republic of China
EA – Eurasian Patent Organization
HK – Hong Kong
IL – Israel
IN – India
JP – Japan
KR – Republic of Korea (South Korea)
MX – Mexico
PH – Philippines
SG – Singapore
TR – Turkey
ZA – South Africa

IRX-2 Patent Families

Descriptions of our patent families with issued patents in the United States or European Union are as follows:

- IRX-2 Modified Manufacturing Process - A method of making a primary cell derived biologic, including the steps of: (a) removing contaminating cells from mononuclear cells (''MNCs'') by loading leukocytes onto lymphocyte separation medium (''LSM''), and washing and centrifuging the medium with an automated cell processing and washing system; (b) storing the MNCs overnight in a closed sterile bag system; (c) stimulating the MNCs with a mitogen and ciprofloxacin in a disposable cell culture system to produce cytokines; (d) removing the mitogen from the mononuclear cells by filtering; (e) incubating the filtered MNCs in a culture medium; (f) producing a clarified supernatant by filtering the MNCs from the culture medium; (g) producing a chromatographed supernatant by removing DNA from the clarified supernatant by anion exchange chromatography; and (h) removing viruses from the chromatographed supernatant by filtering with dual 15 nanometer filters in series, thereby producing a primary cell derived biologic, wherein the primary cell derived biologic comprises IL-1.beta., IL-2, and IFN-.gamma.

- Method of Reversing Immune Suppression of Langerhans Cells - A method of treating human papillomavirus (''HPV''), by administering a therapeutically effective amount of a primary cell-derived biologic to a patient infected with HPV and inducing an immune response to HPV. A method of overcoming HPV-induced immune suppression of Langerhans cells (''LC''), by administering a therapeutically effective amount of a primary cell-derived biologic to a patient infected with HPV and activating LC. A method of increasing LC migration towards lymph nodes, by administering a therapeutically effective amount of a primary cell-derived biologic to a patient infected with HPV, activating LC, and inducing LC migration towards lymph nodes. A method of generating immunity against HPV, by administering an effective amount of a primary cell derived biologic to a patient infected with HPV, generating immunity against HPV, and preventing new lesions from developing.

- Method of Increasing Immunological Effect - A method of increasing immunological effect in a patient by administering an effective amount of a primary cell derived biologic to the patient, inducing immune production, blocking immune destruction, and increasing immunological effect in the patient. Methods of treating an immune target, treating a tumor, immune prophylaxis, and preventing tumor escape.

- Vaccine Immunotherapy/Composition for the Treatment of Advanced Prostate Cancer – A method providing compositions and methods of immunotherapy to treat cancer or other antigen-producing diseases or lesions. According to one embodiment of the invention, a composition is provided for eliciting an immune response to at least one antigen in a patient having an antigen-producing disease or lesion, the composition comprising an effective amount of a cytokine mixture, preferably comprising IL-1, IL-2, IL-6, IL-8, IFN-gamma. (gamma) and TNF- alpha (alpha). The cytokine mixture acts as an adjuvant with the antigen associated with the antigen-producing disease or lesion to enhance the immune response of the patient to the antigen. Methods are therefore also provided for eliciting an immune response to at least one antigen in a patient having an antigen-producing disease or lesion utilizing the cytokine mixture of the invention. The compositions and methods are useful in the treatment of antigen-producing diseases such as cancer, infectious diseases or persistent lesions.

- Immunotherapy for Reversing Immune Suppression - A method for overcoming immune suppression including the steps of inducing production of naïve T-cells and restoring T cell immunity. A method of vaccine immunotherapy includes the steps of inducing production of naïve T cells and exposing the naïve T cells to endogenous or exogenous antigens at an appropriate site. Additionally, a method for unblocking immunization at a regional lymph node includes the steps of promoting differentiation and maturation of immature dendritic cells, thus, for example, exposing tumor peptides to T cells to gain immunization of the T cells. Further, a method of treating cancer and other persistent lesions includes the steps of administering an effective amount of a natural cytokine mixtures an adjuvant to endogenous or exogenous administered antigen to the cancer or other persistent lesions; preferably the natural cytokine mixture is administered with thymosin.

- Vaccine Immunotherapy for Immune Suppressed Patients - A method for overcoming mild to moderate immune suppression includes the steps of inducing production of naive T-cells and restoring T-cell immunity. A method of vaccine immunotherapy includes the steps of inducing production of naive T-cells and exposing the naive T-cells to endogenous or exogenous antigens at an appropriate site. Additionally,

a method for unblocking immunization at a regional lymph node includes the steps of promoting differentiation and maturation of immature dendritic cells at a regional lymph node and allowing presentation of processed peptides by resulting mature dendritic cells, thus, for example, exposing tumor peptides to T-cells to gain immunization of the T-cells. Further, a method of treating cancer and other persistent lesions includes the steps of administering an effective amount of a natural cytokine mixture as an adjuvant to endogenous or exogenous administered antigen to the cancer or other persistent lesions.

- Immunotherapy for Immune Suppressed Patients – A method providing compositions of a natural cytokine mixture (''NCM'') for treating a cellular immunodeficiency characterized by T lymphocytopenia, one or more dendritic cell functional defects such as those associated with lymph node sinus histiocytosis, and/or one or more monocyte functional defects such as those associated with a negative skin test to NCM. The invention includes methods of treating these cellular immunodeficiencies using the NCM of the invention. The compositions and methods are useful in the treatment of diseases associated with cellular immunodeficiencies such as cancer. Also provided are compositions and methods for reversing tumor-induced immune suppression comprising a chemical inhibitor and a non-steroidal anti-inflammatory drug (''NSAID''). The invention also provides a diagnostic skin test comprising NCM for predicting treatment outcome in cancer patients.

Patent Term and Term Extensions

Individual patents have terms for varying periods depending on the date of filing of the patent application or the date of patent issuance and the legal term of patents in the countries in which they are obtained. Generally, utility patents issued for applications filed in the United States and the European Union are granted a term of 20 years from the earliest effective filing date of a non-provisional patent application. In addition, in certain instances, a patent term can be extended to recapture a portion of the U.S. Patent and Trademark Office, or the USPTO, delay in issuing the patent as well as a portion of the term effectively lost as a result of the United States Food and Drug Administration (''FDA'') regulatory review period. However, as to the FDA component, the restoration period cannot be longer than five years and the restoration period cannot extend the patent term beyond 14 years from FDA approval. The duration of foreign patents varies in accordance with provisions of applicable local law, but typically are also 20 years from the earliest effective filing date. All taxes or annuities for a patent, as required by the USPTO and various foreign jurisdictions, must be timely paid in order for the patent to remain in force during this period of time.

The actual protection afforded by a patent may vary on a product-by-product basis, from country to country, and can depend upon many factors, including the type of patent, the scope of its coverage, the availability of regulatory-related extensions, the availability of legal remedies in a particular country and the validity and enforceability of the patent.

Our patents and patent applications may be subject to procedural or legal challenges by others. As of March 17, 2022, three of our in-licensed patents were subject to re-examination by the USPTO: US 90/019,127, re-examination of US10,662,410, US 90/019,128, re-examination of US10,829,738, and US 90/019,129, re-examination of US10,982,229. We may be unable to obtain, maintain and protect the intellectual property rights necessary to conduct our business, and we may be subject to claims that we infringe or otherwise violate the intellectual property rights of others, which could materially harm our business. For more information, see Item 1A ''Risk Factors-Risks Related to Our Intellectual Property'' contained in this Annual Report on Form 10-K.

Supply and Manufacturing

We currently do not have any agreements for the supply or manufacturing of cell lines. However, together with our license partner, Factor Limited, we believe that we have considerable experience in developing engineered cell lines. Pursuant to a Master Services Agreement, dated as of September 9, 2022 (the ''MSA''), by and between us and Factor Bioscience Inc. (''Factor Bioscience''), the parent company of Factor Limited, Factor Bioscience has agreed to provide us with certain mRNA cell engineering research support services, including (i) access to Factor Bioscience's research laboratory facilities located in Cambridge, Massachusetts, (ii) access to Factor Bioscience's scientific equipment, (iii) training of our research staff in certain mRNA, iPSC, and gene editing technologies, (iv) copies of protocols, formulations, and sequences that may be useful for the development of mRNA cell engineering products and (v) in vitro transcription templates, mRNA constructs, and iPS cells that may be useful for the development of mRNA cell engineering products. To the extent that we need to obtain a supply of cell lines or manufacture them, we expect to contract with a contract manufacturing organization or to enter into a new work order under the MSA.

Regulatory Matters

Government regulation and product approval

Government authorities in the United States, at the federal, state and local level, and in other countries extensively regulate, among other things, the research, development, testing, manufacture, labeling, record-keeping, promotion, storage, advertising, distribution, marketing and export and import of products such as those we are developing. Drugs and biologics must be approved by the FDA through the New Drug Application, (''NDA'') process or the Biologic License Application (''BLA'') process before they may be legally marketed in the United States. Henceforth, we will use the term ''marketing application,'' or MA, to apply to both.

There are two centers within the FDA that are responsible for the review and approval of drug and biologic marketing applications and general regulatory oversight: the Center for Drug Evaluation and Research, or CDER, and the Center for Biologics Evaluation and Research (''CBER''). While all conventional drug products are regulated by CDER, biologic products can be regulated by either CDER or CBER, depending on the product's classification.

The majority of BLA submissions are assigned to CBER; however, BLAs for certain biologic product categories are reviewed by CDER. These product categories include monoclonal antibodies for in vivo use, most proteins for therapeutic use, and categories such as cytokines, enzymes, and other novel proteins. Regardless of the category, NDAs for all drug products fall under the jurisdiction of CDER.

In the United States, drugs are subject to rigorous regulation by the FDA under the federal Food, Drug, and Cosmetic Act(''FDCA'') and implementing regulations, and biologics under the FDCA, the Public Health Services Act (''PHSA''), and their implementing regulations. Additionally, drugs and biologics are subject to other federal and state statutes. The process of obtaining regulatory approvals and the subsequent compliance with appropriate federal, state, local, and foreign statutes and regulations require the expenditure of substantial time and financial resources. Failure to comply with the applicable United States requirements at any time during the product development process, approval process, or after approval, may subject an applicant to administrative or judicial sanctions. These sanctions could include the FDA's refusal to approve pending applications, license suspension or revocation, withdrawal of an approval, a clinical hold, warning letters, product recalls, product seizures, total or partial suspension of production or distribution, injunctions, fines, civil penalties or criminal prosecution. Any agency or judicial enforcement action could have a material adverse effect on us. The process required by the FDA before a drug or biologic may be marketed in the United States generally involves the following:

- completion of pre-clinical laboratory tests, animal studies and formulation studies according to the FDA's good laboratory practice, or GLP, regulations;
- submission of an investigational new drug application, or IND, which must become effective before human clinical trials may begin and which must include approval by an institutional review board, or IRB, at each clinical site before the trials are initiated;
- performance of adequate and well-controlled human clinical trials to establish the safety and efficacy of the proposed drug for its intended use conducted in compliance with federal regulations and good clinical practice, or GCP, an international standard meant to protect the rights and health of human clinical trial subjects and to define the roles of clinical trial sponsors, administrators, and monitors;
- submission to, and acceptance by, the FDA of a MA;
- satisfactory completion of an FDA inspection of our manufacturing facility or other facilities at which the drug or biologic is produced to assess compliance with current good manufacturing practice, or cGMP, regulations to assure that the facilities, methods and controls are adequate to preserve the drug's identity, strength, quality and purity;
- potential FDA audit of the non-clinical and clinical trial sites that generated the data in support of the MA: and
- FDA review and approval of the MA.

The testing and approval process require substantial time, effort and financial resources, and the receipt and timing of any approval is uncertain.

United States drug development process

Once a pharmaceutical candidate is identified for development it enters the pre-clinical testing stage. Pre-clinical tests include laboratory evaluations of product chemistry, toxicity and formulation, as well as animal studies. Prior to beginning human clinical trials, a sponsor must submit an IND to the FDA, which includes the results of the pre-clinical tests, together with manufacturing information and analytical data. Some pre-clinical or non-clinical testing may continue even after the IND is submitted. In addition to including the results of the pre-clinical studies, the IND will also include a protocol detailing, among other things, the objectives of the clinical trial, the parameters to be used in monitoring safety and the effectiveness criteria to be evaluated, if the trial lends itself to an efficacy evaluation. The IND automatically becomes effective 30 days after receipt by the FDA, unless the FDA, within the 30-day time period, raises concerns or questions about the conduct of the trial. In such a case, the IND sponsor and the FDA must resolve any outstanding concerns before the clinical trial can begin. The FDA may, at any time, impose a clinical hold on ongoing clinical trials. If the FDA imposes a clinical hold, clinical trials cannot commence or recommence without FDA authorization and then only under terms authorized by the FDA.

Clinical trials involve the administration of the investigational new drug to healthy volunteers or patients under the supervision of one or more qualified investigators in accordance with federal regulations and GCP.

Clinical trials must be conducted under protocols detailing the objectives of the trial and the safety and effectiveness criteria to be evaluated. Each protocol must be submitted to the FDA as part of the IND. Further, an IRB affiliated with each institution participating in the clinical trial must review and approve each protocol before any clinical trial commences at that institution. All research subjects must provide informed consent, and informed consent information must be submitted to the IRB for approval prior to initiation of the trial and prior to providing it to potential subjects. Progress reports detailing the results of the clinical trials must be submitted at least annually to the FDA and more frequently if adverse events or other certain types of other changes occur.

Human clinical trials are typically conducted in three phases. A fourth, or post-approval, phase may include additional clinical studies. These phases generally include the following, and may be sequential, or may overlap or be combined:

- Phase 1 clinical trials involve the initial introduction of the drug or biologic into human subjects. These studies are designed to determine the safety of usually single doses of the compound and determine any dose limiting intolerance, as well as evidence of the metabolism and pharmacokinetics of the drug in humans. For some products for severe or life-threatening diseases, especially if the product may be too toxic to administer to healthy humans, the initial clinical trials may be conducted in individuals having a specific disease for which use the tested product is indicated.
- Phase 2 clinical trials usually involve studies in a limited patient population to evaluate the safety and efficacy of the drug or biologic for specific, targeted indications, to determine dosage tolerance and optimal dosage, and to identify possible adverse effects and safety risks
- In Phase 3, if a compound is found to be potentially effective and to have an acceptable safety profile in Phase 2 (or occasionally Phase 1) studies, the Phase 3 studies will be conducted to further confirm clinical efficacy, optimal dosage and safety within an expanded population which may involve geographically diverse clinical trial sites. Generally, but not always, two adequate and well-controlled Phase 3 clinical trials are required by the FDA for approval of a marketing application.
- Phase 4 clinical trials are studies required of or agreed to by a sponsor that are conducted after the FDA has approved a product for marketing. These studies are used to gain additional experience from the treatment of patients in the intended therapeutic indication and to document a clinical benefit in the case of drugs approved under accelerated approval regulations. If the FDA approves a product while a company has ongoing clinical trials that were not necessary for approval, a company may be able to use the data from these clinical trials to meet all or part of any Phase 4 clinical trial requirement. Failure to promptly conduct Phase 4 clinical trials where necessary could result in withdrawal of approval for products approved under accelerated approval regulations.

While Phase 1, Phase 2, and Phase 3 studies are generally required for approval of a marketing application, certain drugs and biologics may not require one or more steps in the process depending on other testing and the situation involved. Additionally, the FDA, an IRB, or the sponsor may stop testing at any time if results show patients

being exposed to unnecessary health risks or overly dangerous side effects. Prior to the initiation of a clinical trial or at any time during the conduct of studies with human subjects, the FDA may place a study on clinical hold where patients may not be enrolled and ongoing trial activities are suspended until questions around potential safety issues with investigational products are addressed.

In addition, the manufacturer of an investigational drug in a Phase 2 or Phase 3 clinical trial for a serious or life-threatening disease is required to make available, such as by posting on its website, its policy on evaluating and responding to requests for expanded access to such investigational drug.

Concurrent with clinical trials, companies usually complete additional animal studies and must also develop additional information about the mechanism of action and physical characteristics of the drug and finalize a process for manufacturing the product in accordance with cGMP requirements. The manufacturing process must be capable of consistently producing quality batches of the product and, among other requirements, the manufacturer must develop methods for testing the identity, strength, quality, potency, and purity of the final product. Additionally, appropriate packaging must be selected and validated, and stability studies must be conducted to demonstrate that the product does not undergo unacceptable deterioration over its shelf life.

United States drug review and approval process

Following completion of clinical studies, the results are evaluated and, depending on the outcome, submitted to the FDA in the form of an NDA or BLA in order to obtain FDA approval of the product and authorization to commence commercial marketing. In responding to an NDA or BLA, the FDA may require additional testing or information, may require that the product labeling be modified, may impose a post-approval study and other commitments or reporting requirements or other restrictions on product distribution, or may deny the application. The timing of final FDA review and action varies greatly but can take years in some cases and may involve the input of an FDA advisory committee of outside experts. Product sales in the United States may commence only upon FDA approval of an NDA or BLA.

FDA approval of a marketing application is required before marketing of the product may begin in the United States. The MA must include the results of product development, pre-clinical studies and clinical studies, together with other detailed information, including information on the chemistry, manufacture and controls utilized in manufacture of the product. In addition, a MA must also demonstrate purity, specifically in terms of showing that the final product does not contain extraneous material. The FDA has 60 days from its receipt of the MA to review the application to ensure that it is sufficiently complete for substantive review before accepting it for filing. The FDA may request additional information rather than accept an MA for filing. In this event, the MA must be resubmitted with the additional information. The resubmitted application also is subject to review before the FDA accepts it for filing. Once the submission is accepted for filing, the FDA begins an in-depth substantive review. The submission of an MA is also subject to the payment of a substantial application fee (for FDA fiscal year 2023 this fee may exceed 3 million dollars, although a waiver of such fee may be obtained under certain limited circumstances, including when the drug that is subject of the application has received Orphan Drug Designation for the indication sought). Further, the sponsor of an approved MA is subject to an annual program fee, which for FDA fiscal year 2023 is $393,933 per prescription drug product. User fees typically increase annually. The approval process is lengthy and complex, and the FDA may refuse to approve an MA if the applicable regulatory criteria are not satisfied or may require additional clinical or other data and information. Even if such data and information is submitted, the FDA may ultimately decide that the NDA or BLA does not satisfy the criteria for approval. The FDA may also refer applications for novel drug products or drug products which present difficult questions of safety or efficacy to an advisory committee, typically a panel that includes clinicians and other experts, for review, evaluation and a recommendation as to whether the application should be approved. The FDA is not bound by the recommendation of an advisory committee. The FDA reviews an application to determine, among other things, whether a product is safe and effective for its intended use. Before approving an MA, the FDA will inspect the facility or facilities where the product is manufactured to determine whether its manufacturing is cGMP–compliant to assure and preserve the product's identity, potency, quality, purity and stability.

If the FDA's evaluation of the marketing submission or manufacturing facilities is not favorable, the FDA will issue a complete response letter. The complete response letter outlines the deficiencies in the submission and often requires additional testing or information in order for the FDA to reconsider the application. Even after submitting this additional information, the FDA ultimately may decide that the application does not satisfy the regulatory criteria for approval. With limited exceptions, the FDA may withhold approval of a MA regardless of prior advice it may have provided or commitments it may have made to the sponsor.

Once an MA is approved, changes to the conditions of approval, including additional indications, are made by the submission of a supplement to the MA The supplemental NDA, or sNDA, or the supplemental BLA, or sBLA must contain all of the information necessary to support the change. In the case of a new indication, that information usually consists of at least one clinical trial, and often more. Like an MA, FDA determines whether the supplemental application is sufficiently complete to permit review before it is filed. FDA then reviews the supplemental application. The FDA can either approve or issue a complete response letter outlining the deficiencies.

Manufacturing readiness

As part of the approval process, the FDA must inspect and approve each manufacturing facility. Among the conditions of approval is the requirement that a manufacturer's quality control and manufacturing procedures conform to cGMP. Manufacturers must expend significant time, money and effort to ensure continued compliance, and the FDA conducts periodic inspections to verify compliance. If we, or our contract manufacturers, fail to comply or cannot remedy regulator identified deficiencies, then we may be prohibited from marketing product.

If the FDA grants approval, the approval will be limited to those conditions and patient populations for which the product is safe and effective, as demonstrated through clinical studies. Further, a product may be marketed only in those dosage forms and for those indications approved in the MA. Certain changes to an approved MA, including, with certain exceptions, any significant changes to labeling, require approval of a supplemental application before the drug may be marketed as changed. Any products that we manufacture or distribute pursuant to FDA approvals are subject to continuing monitoring and regulation by the FDA, including compliance with cGMP and the reporting of adverse experiences with the drugs. The nature of marketing claims that the FDA will permit us to make in the labeling and advertising of our products will generally be limited to those specified in FDA approved labeling, and the advertising of our products will be subject to comprehensive monitoring and regulation by the FDA. Products whose review was accelerated may carry additional restrictions on marketing activities, including the requirement that all promotional materials are pre-submitted to the FDA. Claims exceeding those contained in approved labeling will constitute a violation of the FDCA. Violations of the FDCA or regulatory requirements at any time during the product development process, approval process, or marketing and sale following approval may result in agency enforcement actions, including corrective advertising, cessation of violative promotion, withdrawal of approval, recall, seizure of products, warning letters, injunctions, fines and/or civil or criminal penalties. Any agency enforcement action could have a material adverse effect on our business.

Failure to comply with applicable federal, state and foreign laws and regulations would likely have a material adverse effect on our business. In addition, federal, state and foreign laws and regulations regarding the manufacture and sale of new drugs are subject to future changes.

Post-approval requirements and consideration

Once an MA is approved, a product will be subject to certain post-approval requirements. For instance, the FDA and Federal Trade Commission closely regulate the post-approval marketing and promotion of drugs and biologics, including standards and regulations for direct-to-consumer advertising, off-label promotion, industry-sponsored scientific and educational activities and promotional activities involving the internet. As a condition of MA approval, the FDA may also require a risk evaluation and mitigation strategy, or REMS, to help ensure that the benefits of the drug or biologic outweigh the potential risks. REMS can include medication guides, communication plans for the healthcare professionals, and other Elements to Assure Safe Use, or ETASU. ETASU can include, but are not limited to, special training or certification for prescribing or dispensing, dispensing only under certain circumstances, special monitoring, and the use of patient registries. The requirement for a REMS can materially affect the potential market and profitability of the drug or biologic.

Drugs and biologics may be marketed only for the approved indications and in accordance with the provisions of the approved labeling. Changes to some of the conditions established in an approved application, including changes in indications, labeling, or manufacturing processes or facilities, require submission and FDA approval of a new MA supplement before the change can be implemented. An MA supplement for a new indication typically requires clinical data similar to that in the original application, and the FDA uses the same procedures and actions in reviewing MA supplements as it does in reviewing MAs.

Adverse event reporting and submission of periodic reports are required following FDA approval of an MA. The FDA also may require post-marketing testing, known as Phase 4 testing, and surveillance to monitor the effects of an approved product or place conditions on an approval that could restrict the distribution or use of the product. In

addition, quality control as well as drug manufacture, packaging, and labeling procedures must continue to conform to cGMPs after approval. Drug and biologic manufacturers and certain of their subcontractors are required to register their establishments with the FDA and certain state agencies and are subject to periodic unannounced inspections by the FDA during which the agency inspects manufacturing facilities to assess compliance with cGMPs. Accordingly, manufacturers must continue to expend time, money and effort in the areas of production and quality control to maintain compliance with cGMPs. Regulatory authorities may withdraw product approvals or request product recalls if a company fails to comply with regulatory standards, if it encounters problems following initial marketing, or if previously unrecognized problems are subsequently discovered.

Foreign regulatory requirements

In addition to regulation by the FDA and certain state regulatory agencies, we are also subject to a variety of foreign regulations governing clinical trials and the marketing of other products. Outside of the United States, our ability to market a product depends upon receiving a marketing authorization from the appropriate regulatory agencies. The requirements governing the conduct of clinical trials, marketing authorization, pricing and reimbursement vary widely from country to country. In any country, however, we will only be permitted to commercialize our products if the appropriate regulatory agency is satisfied that we have presented adequate evidence of safety, quality and efficacy. Whether or not FDA approval has been obtained, approval of a product by the comparable regulatory authorities of foreign countries must be obtained prior to the commencement of marketing of the product in those countries. The regulatory approval and oversight process in other countries includes all of the risks associated with regulation by the FDA and certain state regulatory agencies as described above.

Under the European Union regulatory system, applications for drug approval may be submitted either in a centralized or decentralized manner. Under the centralized procedure, a single application to the European Medicines Agency (''EMA'') may lead to an approval granted by the European Commission which permits marketing of the product throughout the European Union. The decentralized procedure provides for mutual recognition of nationally approved decisions and is used for products that do not comply with requirements for the centralized procedure. Under the decentralized procedure, the holders of national marketing authorization in one of the countries within the European Union may submit further applications to other countries within the European Union, who will be requested to recognize the original authorization based on an assessment report provided by the country in which marketing authorization is held.

Pharmaceutical pricing and reimbursement

In both United States and foreign markets, our ability to commercialize our products successfully, and to attract commercialization partners for our products, depends in significant part on the availability of adequate financial coverage and reimbursement from third-party payors, including, in the United States, governmental payors such as Medicare and Medicaid, managed care organizations, private commercial health insurers and pharmacy benefit managers, or PBMs. Third party payors are increasingly challenging the prices charged for medicines and examining their cost effectiveness, in addition to their safety and efficacy. We may need to conduct expensive pharmacoeconomic or other studies in order to further demonstrate the value of our products. Even with the availability of such studies, any future products of ours may be considered less safe, less effective or less cost-effective than alternative products, and third-party payors may not provide coverage and reimbursement for any future product candidates, in whole or in part.

Political, economic and regulatory influences are subjecting the health care industry in the United States to fundamental changes. There have been, and we expect there will continue to be, legislative and regulatory proposals to change the healthcare system in ways that could significantly affect our business, including the Patient Protection and Affordable Care Act of 2010 (the ''Affordable Care Act'').

We anticipate that in the United States, Congress, state legislatures, and private sector entities will continue to consider and may adopt healthcare policies intended to curb rising healthcare costs. These cost containment measures could include:

- controls on government-funded reimbursement for drugs;
- mandatory rebates or additional charges to manufacturers for their products to be covered on Medicare Part D formularies;
- controls on healthcare providers;

- controls on pricing of pharmaceutical products, including the possible reference of the pricing of United States drugs to non-United States drug pricing for the same product;
- challenges to the pricing of drugs or limits or prohibitions on reimbursement for specific products through other means;
- reform of drug importation laws;
- entering into contractual agreements with payors; and
- expansion of use of managed-care systems in which healthcare providers contract to provide comprehensive healthcare for a fixed cost per person

The Inflation Reduction Act of 2022 (the ''IRA'') contained several provisions designed to curb the prices of drugs and biologics to Medicare beneficiaries. For instance, the IRA will require the federal government to directly negotiate the prices of certain drugs and biologics beginning in 2026. Additionally, beginning in 2023, the IRA requires manufacturers of drugs and biologics to offer rebates if the price of the drug or biologic raises faster than inflation. These and other provisions in the IRA could have a material adverse effect on our business prospects.

We are unable to predict what additional legislation, regulations or policies, if any, relating to the healthcare industry or third-party coverage and reimbursement may be enacted in the future or what effect such legislation, regulations or policies would have on our business. Any cost containment measures, including those listed above, or other healthcare system reforms that are adopted may have a material adverse effect on our business prospects.

Further, the pricing of pharmaceutical products generally, and particularly the pricing of orphan drugs, has recently received scrutiny from the press and from members of Congress in both parties. Some members of the medical community have also made statements in the press on the pricing of orphan drugs. The impact of this scrutiny on the pricing of orphan drugs and other pharmaceutical products generally cannot be determined with any certainty at this time.

The Biologics Price Competition and Innovation Act of 2009, which was included in the Affordable Care Act, authorized the FDA to approve similar versions of innovative biologics, commonly known as biosimilars. Under the Affordable Care Act, a manufacturer may submit an application for licensure of a biologic product that is ''biosimilar to'' or ''interchangeable with'' a previously approved biologic product or ''reference product.'' Manufacturers may not submit an application for a biosimilar to the FDA until four years following approval of the reference product, and the FDA may not approve a biosimilar product until 12 years from the date on which the reference product was approved. Even if IRX-2 or any other biologic product we may acquire or in-license, if approved, are deemed to be reference products eligible for exclusivity, another company could market a competing version of that product if the FDA approves a full BLA for such product containing the sponsor's own preclinical data and data from adequate and well-controlled clinical trials to demonstrate the safety, purity and potency of its product.

Orphan drug exclusivity

Some jurisdictions, including the United States and Europe, may designate drugs or biologic products for relatively small patient populations as orphan drugs. Under the Orphan Drug Act of 1983 (''ODA''), the FDA may grant orphan drug designation to drugs or biologic products intended to treat a rare disease or condition that affects fewer than 200,000 individuals in the United States, or more than 200,000 individuals in the United States and for which there is no reasonable expectation that the cost of developing and making available in the United States a drug for this type of disease or condition will be recovered from sales in the United States for that drug. In the United States, orphan drug designation must be requested before submitting an application for marketing approval. An orphan drug designation does not shorten the duration of the regulatory review and approval process. The grant of an orphan drug designation request does not alter the standard regulatory requirements and process for obtaining marketing approval. Safety and efficacy of a product candidate must be established through adequate and well-controlled studies. If a product which has been granted orphan drug designation subsequently receives the first FDA approval for the indication for which it has such designation, the product is entitled to an orphan drug exclusivity period, which means the FDA may not approve any other application to market the same drug for the same disease or condition for a period of seven years, except in limited circumstances, such as where an alternative product demonstrates clinical superiority to the product with orphan exclusivity. In addition, holders of exclusivity for orphan drugs are expected to assure the availability of sufficient quantities of their orphan drugs to meet the needs of patients. Failure to do so could result in the withdrawal of marketing exclusivity for the drug.

The orphan drug exclusivity contained in the ODA has been the subject of recent scrutiny from the press, from some members of Congress and from some in the medical community. There can be no assurance that the exclusivity granted in ODA to orphan drugs approved by the FDA will not be modified in the future, and as to how any such change might affect our products.

The European Orphan Drug Regulation is considered for drugs intended to diagnose, prevent or treat a life-threatening or very serious condition afflicting five or fewer per 10,000 people in the EU, including compounds that for serious and chronic conditions would likely not be marketed without incentives due to low market return on the sponsor's development investment. The medicinal product considered should be of significant benefit to those affected by the condition. Benefits of being granted Orphan Medicinal Product Designation are significant, including ten years of marketing exclusivity with a potential two-year extension. The EU Community and Member States may not accept or grant for ten years a new marketing authorization or application for another drug for the same therapeutic indication as the orphan drug, although the ten-year period can be reduced to six years if, after the end of the fifth year, available evidence establishes that the product is sufficiently profitable not to justify maintenance of the marketing exclusivity. A supplementary protection certificate may extend the protection six months beyond patent expiration if that is later than the orphan drug exclusivity period. To apply for the supplementary protection, a pediatric investigation plan, or PIP, must be included in the market application. In Europe all drugs now seeking marketing authorization need to have a PIP agreed with the EMA before it can be approved, even if it is a drug being developed specifically for a pediatric indication. If a product is developed solely for use in the pediatric population, then a Pediatric Use Marketing Authorization, or PUMA, may provide eight years of data exclusivity and ten years of marketing exclusivity.

Fast track designation and accelerated approval

The FDA is required to facilitate the development, and expedite the review, of drugs or biologics that are intended for the treatment of a serious or life-threatening disease or condition for which there is no effective treatment and which demonstrate the potential to address unmet medical needs for the condition. Under the fast-track program, the sponsor of a new product candidate may request that FDA designate the product candidate for a specific indication as a fast-track drug concurrent with, or after, the filing of the IND for the product candidate. FDA must determine if the product qualifies for fast-track designation within 60 days of receipt of the sponsor's request.

Under the fast track program and FDA's accelerated approval regulations, FDA may approve a product for a serious or life-threatening illness that provides meaningful therapeutic benefit to patients over existing treatments based upon a surrogate endpoint that is reasonably likely to predict clinical benefit, or on a clinical endpoint that can be measured earlier than irreversible morbidity or mortality, that is reasonably likely to predict an effect on irreversible morbidity or mortality or other clinical benefit, taking into account the severity, rarity, or prevalence of the condition and the availability or lack of alternative treatments.

In clinical trials, a surrogate endpoint is a measurement of laboratory or clinical signs of a disease or condition that substitutes for a direct measurement of how a patient feels, functions, or survives. Surrogate endpoints can often be measured more easily or more rapidly than clinical endpoints. A product approved on this basis is subject to rigorous post-marketing compliance requirements, including the completion of Phase 4 or post-approval clinical trials to confirm the effect on the clinical endpoint. Failure to conduct required post-approval studies, or confirm a clinical benefit during post-marketing studies, will allow FDA to withdraw the product from the market on an expedited basis. All promotional materials for products approved under accelerated regulations are subject to prior review by FDA.

In addition to other benefits such as the ability to use surrogate endpoints and engage in more frequent interactions with FDA, FDA may initiate review of sections of a fast-track drug's MA before the application is complete. This rolling review is available if the applicant provides, and FDA approves, a schedule for the submission of the remaining information and the applicant pays applicable user fees. However, FDA's time period goal for reviewing an application does not begin until the last section of the MA is submitted. Additionally, the fast-track designation may be withdrawn by the FDA if they believe that the designation is no longer supported by data emerging in the clinical trial process.

Priority review

Under FDA policies, a product candidate is eligible for priority review, or review within a six to eight-month time frame from the time a complete MA is submitted, if the product candidate is intended for the treatment, diagnosis, or prevention of a serious or life-threatening condition, demonstrates the potential to address an unmet medical need, or provides a significant improvement compared to marketed drugs.

Disclosure of clinical trial information

Sponsors of clinical trials of FDA-regulated products, including drugs and biologics, are required to register and disclose certain clinical trial information. Information related to the product, patient population, phase of investigation, study sites and investigators, and other aspects of the clinical trial is then made public as part of the registration. Sponsors are also obligated to disclose the results of their clinical trials after completion. Disclosure of results of these trials can be delayed in certain circumstances for up to two years after the date of completion of the clinical trial. Competitors may use this publicly available information to gain knowledge regarding the progress of development programs. Finally, there can be no assurance that fast track designation will result in a faster review process.

Anti-Kickback, False Claims Laws, Stark Law & the Prescription Drug Marketing Act

In addition to FDA restrictions on marketing of pharmaceutical products, other state and federal laws have been applied to restrict certain marketing practices in the pharmaceutical industry in recent years. These laws include anti-kickback prohibition, statutes and false claims statutes. The federal healthcare program Anti-Kickback Statute, or Anti-Kickback Statute, prohibits, among other things, knowingly and willfully offering, paying, soliciting or receiving remuneration to induce or in return for purchasing, leasing, ordering or arranging for the purchase, lease or order of any healthcare item or service reimbursable under Medicare, Medicaid or other federally financed healthcare programs. This statute has been interpreted to apply to arrangements between pharmaceutical manufacturers on the one hand and patients, prescribers, purchasers and formulary managers on the other. Violations of the Anti-Kickback Statute are punishable by imprisonment, criminal fines, civil monetary penalties, and exclusion from participation in federal healthcare programs. Although there are a number of statutory exceptions and regulatory safe harbors protecting certain common activities from prosecution or other regulatory sanctions, the exceptions and safe harbors are drawn narrowly, and practices that involve remuneration intended to induce prescribing, purchases or recommendations may be subject to scrutiny if they do not qualify for an exemption or safe harbor.

Federal false claims laws prohibit, among other things, any person from knowingly presenting, or causing to be presented, a false claim for payment to the federal government, or knowingly making, or causing to be made, a false statement to have a false claim paid. Recently, several pharmaceutical and other healthcare companies have been prosecuted under these laws for allegedly inflating drug prices they report to pricing services, which in turn were used by the government to set Medicare and Medicaid reimbursement rates, and for allegedly providing free product to customers with the expectation that the customers would bill federal programs for the product. In addition, certain marketing practices, including off-label promotion, may also violate false claims laws. The majority of states also have statutes or regulations similar to the Anti-Kickback Statute and false claims laws, which apply to items and services reimbursed under Medicaid and other state programs, or, in several states, apply regardless of the payer.

Federal law includes a provision commonly known as the ‘‘Stark Law.’’ This law prohibits a physician (defined to include a doctor of medicine or osteopathy, a doctor of dental surgery or dental medicine, a doctor of podiatric medicine, a doctor of optometry, or a chiropractor) from referring Medicare and Medicaid patients to certain types of entities with which the physician or any of the physician’s immediate family members have a financial relationship, unless an exception to the law’s prohibition is met. Subject to adherence to their respective criteria requirements, the self-referral prohibition contains a number of exceptions, including exceptions covering employment or independent contractor arrangements, space and equipment leases, and recruitment agreements. Sanctions within the Stark Law include significant civil penalties including over $25,000 for each violation, over $169,000 for schemes to circumvent the Stark Law restrictions, and up to $10,000 for each day an entity fails to report required information and exclusion from the federal healthcare programs. Violations of the Stark Law may also result in payment denials, false claim recoveries, civil monetary penalties, and/or federal program exclusion. Further, several states have enacted statutes similar in scope and purpose to the Stark Law. These state laws may mirror the federal Stark Law or may be different in scope. The available guidance and enforcement activity associated with such state laws varies considerably.

The Physician Payments Sunshine Act, created under the ACA, and its implementing regulations require manufacturers of approved prescription drugs, devices, biologics, and medical supplies, for which payment is available under Medicare, Medicaid or the Children’s Health Insurance Program, with specific exceptions, to annually collect and report information on payments or transfers of value to physicians and teaching hospitals, as well as investment interests held by physicians and their immediate family members. The information reported each year is made publicly available on a searchable website. Failure to submit required information may result in civil monetary penalties.

In addition, several states now require prescription drug companies to report expenses relating to the marketing and promotion of drug products and to report gifts and payments to individual physicians in these states. Other states prohibit various other marketing-related activities. Still other states require the posting of information relating to clinical studies and their outcomes. In addition, California, Connecticut, Nevada, and Massachusetts require pharmaceutical companies to implement compliance programs and/or marketing codes. Several additional states are considering similar proposals. Compliance with these laws is difficult and time consuming, and companies that do not comply with these state laws face civil penalties.

Prescription drug advertising is subject to federal, state and foreign regulations. In the United States, the FDA, along with the Federal Trade Commission, regulates prescription drug promotion, including direct-to-consumer advertising. Prescription drug promotional materials must be submitted to the FDA in conjunction with their first use. Any distribution of prescription drug products and pharmaceutical samples must comply with the United States Prescription Drug Marketing Act, or PDMA, a part of the FDCA. In addition, Title II of the Federal Drug Quality and Security Act of 2013, known as the Drug Supply Chain Security Act, or DSCSA, has imposed new ‘‘track and trace’’ requirements on the distribution of prescription drug products by manufacturers, distributors, and other entities in the drug supply chain. The DSCSA requires product identifiers (i.e., serialization) on prescription drug products in order to eventually establish an electronic interoperable prescription product system to identify and trace certain prescription drugs distributed in the United States and preempts existing state drug pedigree laws and regulations on this topic. The DSCSA also establishes new requirements for the licensing of wholesale distributors and third-party logistic providers. The FDA is the process of finalizing regulations addressing wholesale distributors and third-party logistics providers. We serialize our product at both the package and homogeneous case level, pass serialization and required transaction information to our customers, and believe that we comply with all such requirements.

The Health Insurance Portability and Accountability Act of 1996, or HIPAA, as amended by the Health Information Technology for Economic and Clinical Health Act, sets standards governing the conduct of certain electronic healthcare transactions and protects the security and privacy of protected health information that is stored or transmitted electronically. These include standards for common healthcare transactions, such as: claims information, plan eligibility, payment information and the use of electronic signatures; unique identifiers for providers, employers, health plans and individuals; and security, privacy, breach notification and enforcement. HIPAA transaction regulations establish form, format and data content requirements for most electronic healthcare transactions, such as healthcare claims that are submitted electronically. The HIPAA privacy regulations establish comprehensive requirements relating to the use and disclosure of protected health information. The HIPAA security regulations establish minimum standards for the protection of protected health information that is stored or transmitted electronically. The HIPAA breach notification regulations establish the applicable requirements for notifying individuals, the HHS, and the media in the event of a data breach affecting protected health information. Violations of the privacy, security and breach notification regulations are punishable by civil and criminal penalties.

In addition to the federal HIPAA regulations, most states also have laws that regulate the collection, storage, use, retention, security, disclosure, transfer and other processing of health information and other confidential, sensitive and personal data. Certain of these laws grant individuals rights with respect to their information, and we may be required to expend significant resources to comply with these laws. For example, various states, such as California and Massachusetts, have implemented privacy laws and regulations, such as the California Confidentiality of Medical Information Act, that impose restrictive requirements regulating the use and disclosure of personally identifiable information, including protected health information. These laws in many cases are more restrictive than, and may not be preempted by, the HIPAA rules and may be subject to varying interpretations by courts and government agencies.

Competition

We have competitors both in the United States and internationally, including major multinational pharmaceutical companies, established biotechnology companies, specialty pharmaceutical companies, universities and other research institutions. Many of our competitors have significantly greater financial, manufacturing, marketing, product development, technical and human resources than we do. Large pharmaceutical companies, in particular, have extensive experience in clinical testing, obtaining marketing approvals, recruiting patients and manufacturing pharmaceutical products. Some of these companies also have significantly greater research and marketing capabilities than we do and may also have products or strategic partnerships with entities with products that have been approved or are in late stages of development, and collaborative arrangements in our target markets with leading companies and research institutions. Established pharmaceutical companies may also invest heavily to accelerate discovery and development of novel compounds or to in-license novel compounds that could make our mRNA technology platform

or any therapeutic products that we develop obsolete. Mergers and acquisitions in the pharmaceutical and biotechnology industries may result in even more resources being concentrated among a smaller number of our competitors. As a result of all of these factors, our competitors may succeed in obtaining patent protection and/or marketing approval or discovering, developing and commercializing products in our field before we do.

There are a large number of companies developing or marketing treatments for cancer, including many major pharmaceutical and biotechnology companies. These treatments include both small molecule drug products, such as traditional chemotherapy, as well as novel immunotherapies. Our commercial opportunities could be reduced or eliminated if our competitors develop intellectual property and commercialize products that are safer, more effective, have fewer or less severe effects, are more convenient, have a broader label, are marketed more effectively, are reimbursed or are less expensive than any products developed using our intellectual property or that we may develop. Our competitors also may obtain FDA, EMA or other marketing approval for their products more rapidly than we may obtain approval for ours, which could result in our competitors establishing a strong market position before we are able to enter the market.

Human Capital Resources

Employees

We perform in a highly competitive industry and recognize that our success relies upon our ability to attract, develop and retain a diverse team of talented individuals. We place high value on the satisfaction and well-being of our employees and operate with fair labor standards and industry-competitive compensation and benefits. As of March 20, 2023, we had nine full-time employees, which includes four research and development positions and five administrative positions. None of our employees are covered by collective bargaining agreements.

Compensation, Benefits and Development

Our approach to employee compensation and benefits is designed to deliver cash, equity and benefit programs that are competitive with those offered by leading companies in the biotechnology and pharmaceutical industries to attract, motivate and retain talent with a focus on encouraging performance, promoting accountability and adherence to our values and alignment with the interests of our stockholders.

Our base pay program aims to compensate staff members relative to the value of the contributions of their role, which takes into account the skills, knowledge and abilities required to perform each position, as well as the experience brought to the job. We may also provide our employees with opportunities to earn cash and equity incentive compensation to reward the achievement of company-wide goals that are established annually and designed to drive aspects of our strategic priorities that support and advance our strategy across our company. Our employees are also eligible for the grant of equity awards under our long-term incentive program that are designed to align interests of our employees with that of our stockholders. All employees also participate in a regular performance measurement process through which staff receive performance and development feedback, which is taken into account in determining annual compensation.

Our benefit programs are generally broad-based, promote health and overall well-being and emphasize saving for retirement. All employees are eligible to participate in the same health and retirement savings plans.

Code of Business Conduct and Ethics

We are committed to conducting business in accordance with the highest ethical standards. Our Code of Conduct and Ethics emphasizes the importance of integrity, honesty, forthrightness, respect and fairness. Our Code of Conduct and Ethics applies to all our employees, including those who are integrated into the Company through acquisitions.

Health, Safety and Well-Being

We actively promote the safety, health and well-being of our employees. For example, we focused on employee safety throughout the COVID-19 pandemic by implementing extensive safety measures, which have included, on-site COVID-19 testing protocols and flexible remote working options for most of our employees.

ITEM 1A. *Risk Factors*

Our business, financial condition and operating results can be affected by many factors, whether currently known or unknown, many of which are not exclusively within our control, including but not limited to those described below, any one or more of which could, directly or indirectly, cause our financial condition and operating results to differ materially from historical or anticipated future financial condition and operating results. Any of these factors, in whole or in part, could materially and adversely affect our business, financial condition, operating results and stock price. We urge investors to carefully consider the risk factors described below in evaluating our stock and the information in this Annual Report on Form 10-K, including the consolidated financial statements and the notes thereto and ''Management's Discussion and Analysis of Financial Condition and Results of Operations.''

Risks Related to our Business and Industry

We depend substantially, and expect in the future to continue to depend, on in-licensed intellectual property. Such licenses impose obligations on our business, and if we fail to comply with those obligations, we could lose license rights, which would substantially harm our business.

We are dependent on patents, know-how and proprietary technology licensed from Factor Limited under the Exclusive Factor License Agreement. We may in the future become party to additional license agreements pursuant to which we in-license key intellectual property for the development of therapeutics products both through strategic partnerships and internally. We are party to the Exclusive Factor License Agreement with Factor Limited, pursuant to which we acquired our mRNA technology platform. The Exclusive Factor License Agreement imposes various sublicense fees and other obligations on us. For example, we are obligated to pay the expenses incurred by Factor Limited in preparing, filing, prosecuting and maintaining the Factor Patents and agreed to bear all costs and expenses associated with enforcing and defending the Factor Patents in any action or proceeding arising from pursuit of sublicensing opportunities under the license granted under the Exclusive Factor License Agreement. Factor Limited has customary termination rights under the Exclusive Factor License Agreement, including in connection with certain uncured material breaches of the Exclusive Factor License Agreement and specified bankruptcy events. Any termination of our existing or future licenses could result in the loss of significant rights and would harm our business significantly.

Disputes may also arise between us and our licensors regarding intellectual property subject to a license agreement, including:

- the scope of rights granted under the license agreement and other interpretation-related issues;
- whether and the extent to which our technology and processes infringe intellectual property of the licensor that is not subject to the licensing agreement;
- our right to sublicense patents and other intellectual property to third parties under the license agreement; and
- the ownership of inventions and know-how resulting from any joint creation or use of intellectual property by our licensors and us or our partners.

If disputes over intellectual property that we have licensed, or license in the future, prevent or impair our ability to maintain our current licensing arrangements on acceptable terms, we may be unable to successfully enter into strategic partnerships or develop therapeutic products. In addition, the resolution of any such disputes could narrow what we believe to be the scope of our rights to the relevant intellectual property or technology, or increase what we believe to be our financial or other obligations under the relevant agreement, either of which could have a material adverse effect on our business, financial condition, results of operations, and prospects.

Additionally, we may have limited control over the maintenance, prosecution or enforcement of rights we in-license, and we may also have limited control over activities previously or separately conducted by our licensors. For example, we cannot be certain that activities conducted by Factor Limited or any other present or future licensors have been or will be conducted in compliance with applicable laws and regulations or will result in valid and enforceable patents and other intellectual property rights. We may also have limited control over other intellectual property that is not licensed to us but that may be related to our in-licensed intellectual property. We may have limited control over the manner in which our licensors initiate an infringement proceeding against a third-party infringer or the intellectual property or defend certain of the intellectual property that is licensed to us. It is possible that the licensors' infringement proceedings or defense activities may be less vigorous than had we conducted them ourselves.

We are generally also subject to all of the same risks with respect to protection of intellectual property that we own, as we are for intellectual property that we license. If we or our licensors fail to adequately protect the intellectual property underlying our mRNA technology platform and any other in-licensed intellectual property, our ability to enter into strategic partnerships or develop and commercialize therapeutic products could materially suffer.

We may not realize the benefits of strategic partnerships that we may form in the future or of potential future product acquisitions of licenses.

We intend to form strategic partnerships leveraging our mRNA technology platform, and we may desire to create joint ventures of collaborations, enter into licensing agreements with third parties or acquire products or businesses, in each case that we believe will complement or augment this business strategy. These relationships or transactions, or those like them, may require us to incur nonrecurring and other charges, increase our near- and long-term expenditures, issue securities that dilute our existing stockholders, reduce the potential profitability of any products that are the subject of the relationship or disrupt our management and business. In addition, we face significant competition in seeking appropriate strategic partnerships and transactions and the negotiation process is time-consuming and complex and there can be no assurance that we can enter into any of these transactions even if we desire to do so.

Moreover, we may not be able to realize the anticipated benefit of these transactions if our strategic partners' development of therapeutic products using our in-licensed intellectual property does not meet our expectations. We cannot be certain that, following license, we will achieve the financial or strategic results that would justify the transaction.

We are substantially dependent on intellectual property we in-licensed from Factor Limited, and if we lose the license to such intellectual property or the Exclusive Factor License Agreement is terminated for any reason, our ability to enter into strategic partnerships or develop therapeutics products would be harmed, and our business, financial condition and results of operations would be materially and adversely affected.

Our business is dependent upon the mRNA technology platform licensed from Factor Limited. Pursuant to the Exclusive Factor License Agreement, Factor Limited has customary termination rights, including in connection with certain uncured material breaches of the Exclusive Factor License Agreement, failure to make payments and specified bankruptcy events. Our ability to enter into strategic partnerships or develop therapeutics products using the Factor Patents depends entirely on the effectiveness and continuation of the Exclusive Factor License Agreement. If we lose the right to license any of the mRNA technology platform, our ability to enter into strategic partnerships or develop therapeutic products in the foreseeable future would be harmed. Further, if the Exclusive Factor License Agreement is terminated, there is no guarantee that we will be able to enter into a new license agreement that aligns with our business strategy on the same or similar terms, if at all, and our competitors could in-license the technology, which would result in a significant market disadvantage to us.

We or our licensors may be subject to claims challenging the inventorship or ownership of the patents and other intellectual property that we own or license now or in the future.

We or our licensors may be subject to claims that former employees, collaborators or other third parties have an ownership interest in the patents and intellectual property that we in-license or that we may own or in-license in the future. While it is our policy to require our employees or contractors who may be involved in the development of intellectual property to execute agreements assigning such intellectual property to us, we may be unsuccessful in executing such an agreement with each party who in fact develops intellectual property that we regard as our own or such assignment may not be self-executing, for example, as part of employment or consulting agreements, or may be breached. Our licensors may face similar obstacles. Litigation may be necessary to defend against any claims challenging inventorship or ownership, including in derivation proceedings in the USPTO. If we or our licensors fail in defending any such claims, we may have to pay monetary damages and may lose valuable intellectual property rights, such as exclusive ownership of, or right to use, intellectual property, which could adversely impact our business, results of operations and financial condition.

The failure of our licensees to fulfill their financial obligations with respect to royalty payments under their license agreements or to otherwise perform under their license agreement could have a material adverse effect on our business, financial condition and results of operations.

Our revenues may be dependent on royalty payments made to us pursuant to strategic partnership arrangements or license agreements we may enter into with respect to the mRNA technology platform. We anticipate that such arrangements will often require that licensees advance payment to us for royalties or other milestone payments.

The failure of our licensees to satisfy their financial obligations under these arrangements, or their inability to operate successfully or at all, could result in a breach of an agreement, early termination of an agreement or non-renewal of an agreement, each of which could eliminate some or all of that revenue stream. A decrease or elimination of revenue could have a material adverse effect on our financial condition, results of operations and cash flows. During the term of a license agreement, our revenues will substantially depend on our licensees' ability to develop a successful product candidate with the mRNA technology platform and their failure to do so could harm our future growth and prospects. If our strategic partnerships do not meet expectations and licensees are not successful, our business, financial condition and results of operation could be materially adversely affected.

If conflicts arise between us and our future strategic partners or collaborators, these parties may act in a manner adverse to us and could limit our ability to implement our strategies.

If conflicts arise between our future strategic partners or corporate or academic collaborators and us, the other party may act in a manner adverse to us and could limit our ability to implement our strategies. Future strategic partners or collaborators may develop, either alone or with others, products in related fields that are competitive with the products or potential products that are the subject of our collaborations with such partners or collaborators. Competing products, either developed by the collaborators or strategic partners or to which the collaborators or strategic partners have rights, may result in the withdrawal of partner support for any future product candidates based on our mRNA technology platform or other intellectual property. Our current or future strategic partners or collaborators may preclude us from entering into arrangements with their competitors, terminate their agreements with us prematurely, or fail to devote sufficient resources to the development and commercialization of products. Any of these developments could harm any future product development efforts, which could materially and adversely affect our business and operating results.

We have identified material weaknesses in our internal control over financial reporting. If we are unable to develop and maintain an effective system of internal control over financial reporting, we may not be able to accurately report our financial results in a timely manner, which may adversely affect investor confidence in us, and materially and adversely affect our business and operating results.

In prior periods, we identified two material weaknesses as discussed below.

We identified a material weakness that pertained to us having insufficient accounting staff available to enable and ensure adequate segregation of duties and our lacking appropriate and complete documentation of policies and procedures critical to the accomplishment of financial reporting objectives. In connection with this prior material weakness we implemented remediation measures including the following:

- Increased the number of accounting personnel and reallocated and/or reassigned roles and responsibilities of users to accommodate increased personnel;
- Completed a comprehensive risk assessment to identify, design, and implement our internal controls;
- Implemented improvement and refinement of our internal controls related to our review of users with access to its key financial systems, specifically to validate and evidence that all users were subject to review and access was appropriate;
- Refined our review of user access controls which restrict system users from having access to create and post journal entries; and
- Completed the documentation, review, and enhancement of business policies, procedures, and related internal controls to standardize business processes.

As a result of the above remediation measures, this prior material weakness was remediated as of December 31, 2022.

We were unable to timely file our Q1 2022 10Q with the SEC due to identifying errors in our financial statements reported in the Annual Report on Form 10-K for the years ended December 31, 2021 and 2020 during our preparation of the financial statements for the quarter ended March 31, 2022. Management concluded that the errors were the result of accounting personnel's lack of technical proficiency in complex matters. This material weakness remained unremediated as of December 31, 2022. We filed an amendment to our Annual Report on Form 10-K/A for the years ended December 31, 2021 and 2020 on June 30, 2022 to correct the errors in our financial statements for the years ended December 31, 2021 and 2020 and for the quarters ended June 30, 2020, September 30, 2020, March 31, 2021, June 30, 2021 and September 30, 2021.

As disclosed in Part II, Item 9A to this Annual Report on Form 10-K, our Chief Executive Officer and Chief Financial Officer concluded that, as of December 31, 2022, our disclosure controls and procedures were not effective and did not provide reasonable assurance of achieving the desired control objectives.

For a discussion of management's consideration of its material weaknesses and plans for remediation, see Part II, Item 9A: Controls and Procedures included in this Annual Report on Form 10-K.

A material weakness is a deficiency, or a combination of deficiencies, in internal control over financial reporting such that there is a reasonable possibility that a material misstatement of our annual or interim financial statements will not be prevented or detected and corrected on a timely basis.

Effective internal controls are necessary for us to provide reliable financial reports and prevent fraud. Management plans to implement measures designed to ensure that the deficiencies contributing to the ineffectiveness of our internal control over financial reporting are promptly remediated, such that the internal controls are designed, implemented and operating effectively. The remediation actions planned include: enhancing the business process controls related to reviews over technical, complex, and non-recurring transactions; and providing additional training to accounting personnel and consulting with an accounting advisor for technical, complex and non-recurring matters, with whom we have engaged and begun consulting. We will continue to evaluate steps to remediate the material weaknesses in addition to those currently planned by management. These remediation measures may be costly and there is no assurance that these initiatives will ultimately have the intended effects.

If we identify any additional material weaknesses in the future, any such newly identified material weakness could limit our ability to prevent or detect a misstatement of our accounts or disclosures and could result in a material misstatement of our annual or interim financial statements. In such case, we may be unable to maintain compliance with securities law requirements regarding timely filing of periodic reports, investors may lose confidence in our financial reporting and our stock price may decline as a result. We cannot assure you that the measures we have taken to date, or any measures we may take in the future, will be sufficient to avoid potential future material weaknesses.

We may face litigation and other risks as a result of the material weaknesses in our internal control over financial reporting.

We identified two material weaknesses in our internal controls over financial reporting, one of which was remediated as of December 31, 2022. As a result of the material weaknesses, restating our previously issued financial statements, and other matters that may in the future be raised by the SEC, we may face the potential for litigation or other disputes which may include, among others, claims invoking the federal and state securities laws, contractual claims or other claims arising from the material weakness in our internal control over financial reporting and the preparation of our financial statements. As of the date of this Annual Report on Form 10-K, we have no knowledge of any such litigation or dispute. However, we can provide no assurance that such litigation or dispute will not arise in the future. Any such litigation or dispute, whether successful or not, could have a material adverse effect on our business, results of operations and financial condition or our ability to complete a business combination.

Our business and operations would suffer in the event of system failures, cyber-attacks or a deficiency in our cyber-security.

Our computer systems, as well as those of various third parties on which it relies, may sustain damage from computer viruses, unauthorized access, data breaches, phishing attacks, cybercriminals, natural disasters (including hurricanes and earthquakes), terrorism, war and telecommunication and electrical failures. We rely on our third-party providers to implement effective security measures and identify and correct for any such failures, deficiencies or breaches. The risk of a security breach or disruption, particularly through cyber-attacks or cyber intrusion, including by computer hackers, foreign governments and cyber terrorists, has generally increased as the number, intensity and sophistication of attempted attacks and intrusions from around the world have increased. If such an event were to occur and cause interruptions in our operations, it could result in a material disruption of our drug development and other programs. To the extent that any disruption or security breach were to result in a loss of or damage to our data or applications, or inappropriate disclosure of personal, confidential or proprietary information, we could incur liability and the further development of any product candidate could be delayed.

We face business disruption and related risks resulting from a resurgence of the novel coronavirus (COVID-19) pandemic or a similar pandemic health event in the future.

In December 2019, Chinese officials reported a novel coronavirus (''COVID-19'') outbreak. COVID-19 has since spread throughout the world, leading the World Health Organization to declare on March 11, 2020, that

COVID-19 reached the magnitude of a global pandemic. The rapid spread of COVID-19 throughout the U.S. led federal, state and local governments to take significant steps in an attempt to reduce exposure to COVID-19 and variants of the virus and control their negative effects on public health and the U.S. economy, which steps changed over time and varied by locality. The COVID-19 pandemic has subsided with the normalization of living with COVID-19 following the increase in accessibility to COVID-19 vaccines and antiviral treatments. The development of our product candidates was disrupted by the COVID-19 pandemic, and a resurgence of COVID-19 could disrupt production and cause delays in the supply and delivery of products used in our operations, may affect our operations, including the conduct of clinical studies or other collaborative activities by our strategic partners, may further divert the attention and efforts of the medical community to coping with the COVID-19 and disrupt the marketplace in which we operate and may have a material adverse effects on our operations. COVID-19 may also affect our employees and employees and operations at suppliers that may result in delays or disruptions in supply. In addition, a recession or market correction resulting from the spread of COVID-19 could materially affect our business and the value of our common stock. A future pandemic unrelated to COVID-19 may lead to similar disruptions to our operations and materially affect our business and the value of our common stock.

Risks Related to New, Cutting Edge Technologies

Because gene-editing and cell therapy product candidates that may be developed using our mRNA technology platform are based on novel technologies, we cannot assure that such products will be successful.

Cellular immunotherapies, stem cell therapies, gene-edited, and iPSC-derived product candidates represent relatively new therapeutic areas, and the FDA has cautioned consumers about potential safety risks associated with them. To date, there are relatively few approved cell therapies. As a result, the regulatory approval process for a gene-editing or cellular therapy product candidates are uncertain and may be more expensive and take longer than the approval process for product candidates based on other, better known or more extensively studied technologies and therapeutic approaches. For example, there are no new FDA approved products with a label designation that supports the use of a product to treat and reduce the severity of ARDS in patients with COVID-19, which makes it difficult to determine the clinical endpoints and data required to support an application or regulatory approval, and the time and cost required to obtain regulatory approval in the United States for the product candidates we or our strategic partners may develop.

Cell reprogramming technology and related cell therapy products using iPSC lines represent novel therapeutic approaches, and to our knowledge no iPSC-derived cell products are currently approved for commercial sale anywhere in the world. As such, it is difficult to accurately predict the type and scope of challenges that we will incur effecting our plan to develop and advance a pipeline of therapeutic products both internally and through strategic partnerships. We and our strategic partners thus face uncertainties associated with the preclinical and clinical development, manufacture, and regulatory compliance for the initiation and conduct of clinical trials, regulatory approval, and reimbursement required for successful commercialization of product candidates.

Regulatory processes in the United States governing cell therapy products have changed frequently and the FDA or other regulatory bodies may change the requirements, or identify different regulatory pathways, for approval of these product candidates. For example, within the FDA, the Center for Biologics Evaluation and Research, CBER, restructured and created a new Office of Tissues and Advanced Therapies, OTAT, to better align its oversight activities with FDA Centers for Drugs and Medical Devices. It is possible that over time new or different divisions may be established or be granted the authority for regulating cell and/or gene therapy products, including iPSC-derived cell products. As a result, we or our strategic partners may be required to change regulatory strategies or to modify applications for regulatory approval, which could delay and impair our ability to complete the pre-clinical and clinical development and manufacture of, and obtain regulatory approval for, our product candidates. Changes in regulatory authorities and advisory groups, or any new requirements or guidelines they promulgate, may lengthen the regulatory review process, require us to perform additional studies, increase development and manufacturing costs, lead to changes in regulatory pathways, positions and interpretations, delay or prevent approval and commercialization of product candidates developed through our strategic partners or lead to significant post-approval limitations or restrictions that may reduce the anticipated benefits of our strategic partnerships.

Likewise, gene editing technology is relatively new, and no products based on such technology have been approved in the U.S. or the E.U. to date, and only a limited number of clinical trials of product candidates based on gene-editing technologies have been commenced. As such, it is difficult to accurately predict the developmental challenges we may incur pursuing our business strategy. There may be long-term effects from treatment with any such product candidates that we or our strategic partners may develop that we cannot predict at this time. Any such

product candidates may interact with genetic material (RNA/DNA) and because animal genetic materials differ from human genetic material, past testing of any such product candidates in animal models may not be predictive of results in human clinical trials for safety or efficacy. As a result of these factors, it is more difficult to predict the time and cost of such product candidate development, and we cannot predict whether the application of gene editing technology, or other similar or competitive gene editing technologies, will result in the identification, development and regulatory approval of any products.

The clinical trial requirements of the FDA, the EMA and other regulatory authorities and the criteria these regulators use to determine the safety and efficacy of a product candidate vary substantially according to the type, complexity, novelty and intended use and market of the product candidate. No products based on gene-editing technologies have been approved by regulators to date. As a result, the regulatory approval process for product candidates using such technology is uncertain and may be more expensive and take longer than the approval process for product candidates based on other, better known or more extensively studied technologies. It is difficult to determine how long it will take or how much it will cost to obtain regulatory approvals for product candidates using this technology in either the United States or the E.U. or how long it will take to commercialize any product candidates. Delay or failure to obtain, or unexpected costs in obtaining, the regulatory approval necessary to bring a potential product candidate to market could decrease our ability to generate sufficient product revenue, and our business, financial condition, results of operations and prospects may be harmed.

Regulatory requirements in the United States and in other jurisdictions governing gene therapy products have changed frequently and may continue to change in the future. In January 2020, the FDA issued several new guidance documents on gene therapy products. The FDA established the Office of Tissues and Advanced Therapies within its Center for Biologics Evaluation and Research to consolidate the review of gene therapy and related products, and established the Cellular, Tissue and Gene Therapies Advisory Committee to advise this review. Adverse developments in clinical trials of gene therapy products conducted by others may cause the FDA or other oversight bodies to change the requirements for approval of any of our or our strategic partners' product candidates. Similarly, the EMA governs the development of gene therapies in the EU and may issue new guidelines concerning the development and marketing authorization for gene therapy products and require that we comply with these new guidelines. These regulatory review agencies and committees and the new requirements or guidelines they promulgate may lengthen the regulatory review process, which may reduce the anticipated benefits of our strategic partnerships or adversely affect the commercialization of any future therapeutic products that we may develop.

Risks Related to Ownership of our Common Stock

We have a limited operating history and have never generated any product revenue.

We were formed in September 2018, for the purpose of consummating a business combination with IRX Therapeutics, Inc., which business combination was consummated in November 2018. Since inception, we have incurred significant net losses. As of December 31, 2022, we had an accumulated deficit of approximately $165.3 million. Since inception, we have financed our operations with capital contributions from the former beneficial holders of Eterna LLC's Class A membership interests, as well as through the sale of our securities under the Purchase Agreements with the Investment Group and in connection with certain private placement transactions.

We have never been profitable, have no products approved for commercial sale, and have not generated any product revenue.

While we plan to develop and advance a pipeline of therapeutic products both internally and through strategic partnerships, it is possible that none of such products will obtain necessary regulatory approvals or be commercialized.

Our expenses could increase beyond expectations. Even if our strategic partners successfully develop and advance therapeutic products using our mRNA technology platform or our other intellectual property and such products are commercialized, we may incur significant costs associated with the related strategic partnership. If we cannot successfully execute any one of the foregoing, our business may not succeed, and your investment will be negatively impacted.

Furthermore, we sometimes estimate for planning purposes the timing of the accomplishment of various scientific, clinical, regulatory and other product development objectives by our strategic partners or collaborators, as well as milestones under our strategic arrangements or sublicense agreements with third parties. These milestones may include our expectations regarding the commencement or completion of scientific studies, clinical trials, the submission of regulatory filings or commercialization objectives. From time to time, we may publicly announce the

expected timing of some of these milestones. The achievement of these milestones by our strategic partners or collaborators will generally be outside of our control. All of these milestones are based on a variety of assumptions, which may cause the timing of achievement of the milestones to vary considerably from our estimates. If our strategic partners or collaborators fail to achieve milestones in the timeframes we expect, we may not be entitled to receive certain contractual payments, which could have a material adverse effect on our business, financial position, results of operations and future growth prospects.

If we are not successful in attracting and retaining highly qualified personnel, we may not be able to successfully implement our business strategy.

Our ability to compete in the highly competitive pharmaceuticals industry depends in large part upon the ability to attract highly qualified managerial, scientific and medical personnel. In order to induce valuable employees to remain with us, we intend to provide employees with stock options that vest over time. The value to employees of stock options that vest over time will be significantly affected by movements in the price of the common stock that it will not be able to control and may at any time be insufficient to counteract more lucrative offers from other companies.

Competition for skilled personnel in our industry is intense and competition for experienced scientists may limit our ability to hire and retain highly qualified personnel on acceptable terms. Despite our efforts to retain valuable employees, members of our management, scientific and medical teams may terminate their employment with us on short notice. Our success also depends on our ability to continue to attract, retain and motivate highly skilled junior, mid-level, and senior managers as well as junior, mid-level, and senior scientific and medical personnel.

Other companies with which we compete for qualified personnel have greater financial and other resources, different risk profiles, and a longer history in the industry than we do, and such companies also may provide more diverse opportunities and better chances for career advancement. Some of these characteristics may be more appealing to high-quality candidates than what Eterna has to offer. If we are unable to continue to attract and retain high-quality personnel, the rate and success at which we can pursue our business strategy would be limited.

Risks Related to our Financial Position and Capital Requirements

We may acquire businesses, assets or products, or form strategic alliances, in the future, and we may not realize the benefits of such acquisitions.

We may acquire additional businesses, assets or products, form strategic alliances or create joint ventures with third parties that we believe will complement or augment our existing business. If we acquire businesses with promising intellectual property, markets or technologies, we may not be able to realize the benefit of acquiring such businesses if we are unable to successfully integrate them with our existing operations and company culture. We may encounter numerous difficulties in developing, manufacturing and marketing any new acquisition. Difficulties may prevent us from realizing its expected benefits or enhancing our business. We cannot assure you that, following any such acquisition, we will achieve the expected synergies to justify the transaction.

We will require substantial additional capital to fund our operations, and if we fail to obtain the necessary financing, we may not be able to pursue our business strategy.

We will require additional capital to develop and advance our pipeline of therapeutic products both internally and through strategic partnerships. Because the length of time and activities associated with successful development of such products by us or our strategic partners are highly uncertain, we are unable to estimate with certainty the actual funds we will require for development and commercialization activities. Our future funding requirements, both near- and long-term, will depend on many factors, including, but not limited to:

- the cost of filing, prosecuting, defending and enforcing its patent claims and other intellectual property rights;
- the cost of defending potential intellectual property disputes, including patent infringement actions brought by third parties against us or any of our strategic partners or collaborators; and
- the effect of competing market developments.

Based on currently available information and our ongoing operations, we believe that our existing cash will not be sufficient for us to fund our operating expenses and capital expenditure requirements through the twelve-month period subsequent to the issuance date of this report. We intend to raise additional sources of capital, which could

be in the form of debt, grants or equity. We cannot be certain that additional capital will be available on acceptable terms, or at all. If we are unable to raise additional capital in sufficient amounts or on terms acceptable to us, we may have to significantly delay, scale back or discontinue our business activities, or potentially discontinue operations altogether. In addition, attempting to secure additional capital may divert the time and attention of our management from day-to-day activities and harm its ability to execute on our overall strategy. We are unable to estimate the amounts of increased capital outlays, operating expenditures and capital requirements associated with our current commercialization strategy.

Raising additional funds by issuing equity securities may cause dilution to existing holders, raising additional funds through debt financings may involve restrictive covenants, and raising funds through lending and licensing arrangements may restrict our operations or require us to relinquish proprietary rights.

We expect that significant additional capital will be needed in the future to continue our planned operations. Until such time, if ever, that we can generate substantial product revenue, directly or through our strategic partnerships, we expect to finance our cash needs through a combination of equity offerings, debt financings, strategic alliances and license and development agreements or other collaborations. To the extent that we raise additional capital by issuing equity securities, existing stockholder ownership may experience substantial dilution, and the securities may include preferred shares with liquidation or other preferences that could harm the rights of a common stockholder.

We plan to raise additional funds through collaborations, strategic alliances or marketing, distribution or licensing arrangements with third parties, and as a result we may have to relinquish valuable rights to our technologies, future revenue streams, research programs or product candidates, or grant licenses on terms that may not be favorable to us.

Risks Related to Regulatory Requirements

We are subject to extensive and costly government regulation.

Product candidates employing medical technology are subject to extensive and rigorous domestic government regulation including regulation by the FDA, the Centers for Medicare and Medicaid Services, or CMS, other divisions of the United States Department of Health and Human Services, the United States Department of Justice, state and local governments, and their respective foreign equivalents. If products employing our technologies are marketed abroad, they will also be subject to extensive regulation by foreign governments, whether or not they have obtained FDA approval for a given product and its uses. Such foreign regulation may be equally or more demanding than corresponding United States regulation.

Government regulation substantially increases the cost and risk of researching, developing, manufacturing, and selling medical products. Even if we or our strategic partners are able to obtain regulatory approval for a particular product, the approval may limit the indicated medical uses for the product, may otherwise limit our ability to promote, sell, and distribute the product, may require costly post-marketing surveillance, and/or may require ongoing post-marketing studies. Material changes to an approved product, such as, for example, manufacturing changes or revised labeling, may require further regulatory review and approval. Once obtained, any approvals may be withdrawn, including, for example, if there is a later discovery of previously unknown problems with the product, such as a previously unknown safety issue.

In addition, regulatory agencies may not approve the labeling claims that are necessary or desirable for the successful commercialization of a product candidate. For example, regulatory agencies may approve a product candidate for fewer or more limited indications than requested or may grant approval subject to the performance of post-marketing studies. Regulators may approve a product candidate for a smaller patient population, a different drug formulation or a different manufacturing process, than we or our strategic partners are seeking.

Healthcare legislative reform measures and constraints on national budget social security systems may have a material adverse effect on our business and results of operations.

Payors, whether domestic or foreign, or governmental or private, are developing increasingly sophisticated or complex methods of controlling healthcare costs and those methods are not always specifically adapted for new technologies such as those we are developing. In both the United States and certain foreign jurisdictions, there have been a number of legislative and regulatory changes to the health care system that could impact our ability to sell our products profitably. In particular, in the United States, the Affordable Care Act, among other things, subjects biologic products to potential competition by lower-cost biosimilars; addresses a new methodology by which rebates

owed by manufacturers under the Medicaid Drug Rebate Program are calculated for drugs that are inhaled, infused, instilled, implanted or injected; increases the minimum Medicaid rebates owed by most manufacturers under the Medicaid Drug Rebate Program; extends the Medicaid Drug Rebate program to utilization of prescriptions of individuals enrolled in Medicaid managed care organizations; subjects manufacturers to new annual fees and taxes for certain branded prescription drugs; and provides incentives to programs that increase the federal government's comparative effectiveness research.

In addition, other legislative changes have been proposed and adopted in the United States since the Affordable Care Act was enacted. In August 2011, the Budget Control Act of 2011, among other things, created measures for spending reductions by Congress. A Joint Select Committee on Deficit Reduction, tasked with recommending a targeted deficit reduction of at least $1.5 trillion for the years 2013 through 2021, was unable to reach required goals, thereby triggering the legislation's automatic reduction to several government programs. This includes aggregate reductions of Medicare payments to providers of 2% per fiscal year, which went into effect in April 2013, and due to subsequent legislative amendments, including the BBA, will remain in effect through 2027 unless additional Congressional action is taken. The CARES Act, the Consolidated Appropriations Act of 2021, and the Act to Prevent Across-the-Board Direct Spending Cuts suspended the 2% sequestration mandated by the Budget Control Act of 2011 and the American Relief Act of 2011 through December 31, 2021. In December 2021, Congress extended the suspension of the automatic 2% reduction through March 2022 and reduced the sequestration adjustment to 1% beginning on April 1, 2022 through June 30, 2022, with the full 2% reduction for sequestration resuming thereafter. In January 2013, the American Taxpayer Relief Act of 2012, was signed into law, which, among other things, further reduced Medicare payments to several providers, including hospitals and cancer treatment centers, and increased the statute of limitations period for the government to recover overpayments to providers from three to five years. We cannot anticipate whether Congress will further extend the sequestration and when the sequestration reimbursement will return.

Also, there has been heightened governmental scrutiny recently over the manner in which drug manufacturers set prices for their marketed products, which has resulted in several Congressional inquiries and proposed and enacted federal and state legislation designed to, among other things, bring more transparency to product pricing, review the relationship between pricing and manufacturer patient programs, and reform government program reimbursement methodologies for drug products. For example, in November 2018, CMS issued a proposed rule for comment that would, among other things, provide Medicare prescription drug plans under Part D more transparency in pricing and greater flexibility to negotiate discounts for, and in certain circumstances exclude, drugs in the six ''protected'' formulary classes and allow Medicare Advantage plans to use certain drug management tools such as step therapy for physician-administered drugs. The IRA, among other things, requires drug manufacturers to offer rebates if the prices rise faster than inflation. Although a number of these, and other proposed measures will require authorization through additional legislation to become effective, Congress and the Biden administration has each indicated that it will continue to seek new legislative and/or administrative measures to control drug costs.

There have been, and likely will continue to be, legislative and regulatory proposals at the foreign, federal and state levels directed at broadening the availability of healthcare and containing or lowering the cost of healthcare. We cannot predict the initiatives that may be adopted in the future. The continuing efforts of these governments and other payors to contain or reduce costs of healthcare and/or impose price controls may adversely affect:

- the demand for our or our strategic partners' product candidates, if we or they obtain regulatory approval;
- the ability to set a price that we believe is fair for such products;
- our ability to generate revenue and achieve or maintain profitability;
- the level of taxes that we are required to pay; and
- the availability of capital.

Any denial in coverage or reduction in reimbursement from Medicare or any other government programs may result in a similar denial or reduction in payments from private payors, which may adversely affect our future profitability.

Risks Relating to Eterna's Intellectual Property

If we are unable to obtain and maintain patent and other intellectual property protection, or if the scope of the patent and other intellectual property protection obtained is not sufficiently broad, our competitors could develop and commercialize products similar or identical to those derived from our intellectual property, and our ability to achieve profitability may be adversely affected.

Our ability to compete effectively will depend, in part, on our ability to maintain the proprietary nature of our technology and manufacturing processes. We rely on research, manufacturing and other know-how, patents, trade secrets, license agreements and contractual provisions to establish our intellectual property rights. These legal means, however, afford only limited protection and may not adequately protect our rights.

In certain situations, and as considered appropriate, we have sought, and we intend to continue to seek to protect our proprietary position by filing patent applications in the United States and, in at least some cases, one or more countries outside the United States relating to future products and product candidates that we or our strategic partners or collaborators may develop that are important to our business. However, we cannot predict whether the patent applications currently being pursued will issue as patents, or whether the claims of any resulting patents will provide us with a competitive advantage or whether we will be able to successfully pursue patent applications in the future relating to such products and product candidates. Moreover, the patent application and approval processes are expensive and time-consuming. We may not be able to file and prosecute all necessary or desirable patent applications at a reasonable cost or in a timely manner. Furthermore, we, or any future partners, collaborators, or licensees, may fail to identify patentable aspects of inventions made in the course of development and commercialization activities before it is too late to obtain patent protection on them. Therefore, we may miss potential opportunities to seek additional patent protection. It is possible that defects of form in the preparation or filing of patent applications may exist, or may arise in the future, for example with respect to proper priority claims, inventorship, claim scope, or requests for patent term adjustments. If we fail to establish, maintain or protect such patents and other intellectual property rights, such rights may be reduced or eliminated. If there are material defects in the form, preparation, prosecution or enforcement of our patents or patent applications, such patents may be invalid and/or unenforceable, and such applications may never result in valid, enforceable patents.

Even if they are unchallenged, our patents and patent applications, if issued, may not provide us with any meaningful protection or prevent competitors from designing around our patent claims by developing similar or alternative technologies or therapeutics in a non-infringing manner. For example, a third party may develop a competitive therapy that provides benefits similar to one or more of the future products and product candidates that we or our strategic partners or collaborators may develop but that falls outside the scope of our patent protection. If the patent protection provided by the patents and patent applications we hold or pursue with respect to such product candidates is not sufficiently broad to impede such competition, the successful commercialization of such product candidates could be negatively affected.

Other parties, many of whom have substantially greater resources and have made significant investments in competing technologies, have developed or may develop technologies that may be related or competitive with our approach, and may have filed or may file patent applications and may have been issued or may be issued patents with claims that overlap or conflict with our patent applications, either by claiming the same compositions, formulations or methods or by claiming subject matter that could dominate our patent position. In addition, the laws of foreign countries may not protect our rights to the same extent as the laws of the United States. As a result, any patents we may obtain in the future may not provide us with adequate and continuing patent protection sufficient to exclude others from commercializing products similar to future products and product candidates that we or our strategic partners or collaborators may develop.

The patent position of biotechnology and pharmaceutical companies generally is highly uncertain. No consistent policy regarding the breadth of claims allowed in biotechnology and pharmaceutical patents has emerged to date in the United States or in many foreign jurisdictions. In addition, the determination of patent rights with respect to pharmaceutical compounds commonly involves complex legal and factual questions, which has in recent years been the subject of much litigation. As a result, the issuance, scope, validity, enforceability and commercial value of our patent rights are highly uncertain. Our competitors may also seek approval to market their own products similar to or otherwise competitive with our products. Alternatively, our competitors may seek to market generic versions of any approved products by submitting ANDAs or ABLAs to the FDA in which they claim that our patents are invalid, unenforceable or not infringed. In these circumstances, we may need to defend or assert our patents, or both, including by filing lawsuits alleging patent infringement. In any of these types of proceedings, a court or other agency

with jurisdiction may find our patents invalid or unenforceable, or that our competitors are competing in a non-infringing manner. Thus, even if we have valid and enforceable patents, these patents still may not provide protection against competing products or processes sufficient to achieve our business objectives.

In addition to patent protection, we expect to rely heavily on trade secrets, know-how and other unpatented technology, which are difficult to protect. Although we seek such protection in part by entering into confidentiality agreements with our vendors, employees, consultants and others who may have access to proprietary information, we cannot be certain that these agreements will not be breached, adequate remedies for any breach would be available, or our trade secrets, know-how and other unpatented proprietary technology will not otherwise become known to or be independently developed by our competitors. If we are unsuccessful in protecting our intellectual property rights, sales of our products may suffer and our ability to generate revenue could be severely impacted.

Issued patents covering future products and product candidates that we or our strategic partners or collaborators may develop could be found invalid or unenforceable if challenged in court or in administrative proceedings. We may not be able to protect our trade secrets in court.

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

In addition, our trade secrets may otherwise become known or be independently discovered by competitors. Competitors and other third parties could purchase future products and product candidates that we or our strategic partners or collaborators may develop and attempt to replicate some or all of the competitive advantages we derive from our development efforts, willfully infringe, misappropriate or otherwise violate our intellectual property rights, design around our protected technology or develop their own competitive technologies that fall outside of our intellectual property rights. If any of our trade secrets were to be lawfully obtained or independently developed by a competitor or other third party, we would have no right to prevent them, or those to whom they communicate it, from using that technology or information to compete with us. If our trade secrets are not adequately protected or sufficient to provide an advantage over our competitors, our competitive position could be adversely affected, as could 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 our trade secrets.

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

Periodic maintenance fees, renewal fees, annuity fees and various other governmental fees on patents and applications are required to be paid to the USPTO and various governmental patent agencies outside of the United States in several stages over the lifetime of the patents and applications. The USPTO and various non-U.S. governmental patent agencies require compliance with a number of procedurals, documentary, fee payment and other similar provisions during the patent application process and after a patent has issued. There are situations in which non- compliance can result in abandonment or lapse of the patent or patent application, resulting in partial or complete loss of patent rights in the relevant jurisdiction. The terms of one or more licenses that we enter into the

future may not provide us with the ability to maintain or prosecute patents in the portfolio and must therefore rely on third parties to do so. If we fail to obtain and maintain the patents and patent applications covering our products or procedures, we may not be able to stop a competitor from marketing products that are the same as our product candidates, which could have a material adverse effect on our business.

If we do not obtain patent term extension and data exclusivity for future products and product candidates that we or our strategic partners or collaborators may develop, our business may be materially harmed.

Patents have a limited lifespan. In the United States, if all maintenance fees are timely paid, the natural expiration of a patent is generally 20 years from its earliest U.S. non-provisional filing date. Various extensions may be available, but the life of a patent, and the protection it affords, is limited. Even if patents covering future products and product candidates that we or our strategic partners or collaborators may develop are obtained, once the patent life has expired for a product candidate, we or our strategic partners or collaborators may be open to competition from competitive products. Given the amount of time required for the development, testing and regulatory review of new product candidates, patents protecting such candidates might expire before or shortly after such candidates are commercialized. As a result, our patent portfolio may not provide us with sufficient rights to exclude others from commercializing products similar or identical to ours.

In the future, if we obtain an issued patent covering one of future products and product candidates that we or our strategic partners or collaborators may develop, depending upon the timing, duration and specifics of any FDA marketing approval of such product candidates, such patent may be eligible for limited patent term extension under the Drug Price Competition and Patent Term Restoration Act of 1984, or Hatch-Waxman Amendments. The Hatch-Waxman Amendments permit a patent extension term of up to five years as compensation for patent term lost during the FDA regulatory review process. A patent term extension cannot extend the remaining term of a patent beyond a total of 14 years from the date of product approval, only one patent may be extended and only those claims covering the approved drug, a method for using it or a method for manufacturing it may be extended. A patent may only be extended once and only based on a single approved product. However, we may not be granted an extension because of, for example, failure to obtain a granted patent before approval of a product candidate, failure to exercise due diligence during the testing phase or regulatory review process, failure to apply within applicable deadlines, failure to apply prior to expiration of relevant patents or otherwise our failure to satisfy applicable requirements. A patent licensed to us by a third party may not be available for patent term extension. Moreover, the applicable time period or the scope of patent protection afforded could be less than we request. If we are unable to obtain patent term extension or the term of any such extension is less than we request, our competitors may obtain approval of competing products following our patent expiration, and our revenue could be reduced, possibly materially.

Changes in patent law in the United States and other jurisdictions could diminish the value of patents in general, thereby impairing our ability to protect future products and product candidates that we or our strategic partners or collaborators may develop.

Changes in either the patent laws or the interpretation of the patent laws in the United States or other jurisdictions could increase the uncertainties and costs surrounding the prosecution of patent applications and the enforcement or defense of issued patents. On September 16, 2011, the Leahy-Smith America Invents Act, or the Leahy-Smith Act, was signed into law. When implemented, the Leahy-Smith Act included several significant changes to U.S. patent law that impacted how patent rights could be prosecuted, enforced and defended. In particular, the Leahy-Smith Act also included provisions that switched the United States from a ‘‘first-to-invent’’ system to a ‘‘first-to-file’’ system, allowed third- party submission of prior art to the USPTO during patent prosecution and set forth additional procedures to attack the validity of a patent by the USPTO administered post grant proceedings. Under a first-to-file system, assuming the other requirements for patentability are met, the first inventor to file a patent application generally will be entitled to the patent on an invention regardless of whether another inventor had made the invention earlier. The USPTO developed new regulations and procedures governing the administration of the Leahy-Smith Act, and many of the substantive changes to patent law associated with the Leahy-Smith Act, and in particular, the first to file provisions, only became effective on March 16, 2013. Some of the Company’s patents and patent applications have effective dates later than March 16, 2013 and thus will be subject to the provisions of the Leahy-Smith Act.

In addition, the patent positions of companies in the development and commercialization of biologics and pharmaceuticals are particularly uncertain. Recent rulings from the U.S. Court of Appeals for the Federal Circuit and the U.S. Supreme Court have narrowed the scope of patent protection available in certain circumstances and

weakened the rights of patent owners in certain situations. This combination of events has created uncertainty with respect to the validity and enforceability of patents, once obtained. Depending on future actions by the U.S. Congress, the federal courts, and the USPTO, the laws and regulations governing patents could change in unpredictable ways that could have a material adverse effect on our existing patent portfolio and our ability to protect and enforce our intellectual property in the future.

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

Filing, prosecuting, maintaining, defending and enforcing patents on products and product candidates in all countries throughout the world would be prohibitively expensive, and our intellectual property rights in some countries outside the United States could be less extensive than those in the United States. The requirements for patentability may differ in certain countries, particularly in developing countries; thus, even in countries where we do pursue patent protection, there can be no assurance that any patents will issue with claims that cover our products. There can be no assurance that we will obtain or maintain patent rights in or outside the United States under any future license agreements. In addition, the laws of some foreign countries do not protect intellectual property rights to the same extent as federal and state laws in the United States. Consequently, we may not be able to prevent third parties from utilizing our inventions in all countries outside the United States, even in jurisdictions where we pursue patent protection, or from selling or importing products made using our inventions in and into the United States or other jurisdictions. Competitors may use our technologies in jurisdictions where we have not pursued and obtained patent protection to develop their own products and, further, may export otherwise infringing products to territories where we have patent protection, but enforcement is not as strong as that in the United States. These products may compete with future products and product candidates that we or our strategic partners or collaborators may develop and our patents or other intellectual property rights may not be effective or sufficient to prevent them from competing.

Many companies have encountered significant problems in protecting and defending intellectual property rights in foreign jurisdictions. The legal systems of certain countries, particularly certain developing countries, do not favor the enforcement of patents, trade secrets and other intellectual property protection, particularly those relating to biotechnology and pharmaceutical products, which could make it difficult for us to stop the infringement of our patents or marketing of competing products in violation of our proprietary rights generally. For example, many foreign countries have compulsory licensing laws under which a patent owner must grant licenses to third parties. Proceedings to enforce our patent rights, even if obtained, in foreign jurisdictions could result in substantial costs and divert our efforts and attention from other aspects of our business, could put our patents at risk of being invalidated or interpreted narrowly and our patent applications at risk of not issuing and could provoke third parties to assert claims against us. We may not prevail in any lawsuits that we initiate and the damages or other remedies awarded, if any, may not be commercially meaningful. While we intend to protect our intellectual property rights in major markets for our products, we cannot ensure that we will be able to initiate or maintain similar efforts in all jurisdictions in which we may wish to market our products. 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.

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

Many of our current and former employees, including our senior management, were previously employed at universities or at other biotechnology or pharmaceutical companies, including some which may be competitors or potential competitors. Some of these employees may be subject to proprietary rights, non-disclosure and non-competition agreements, or similar agreements, in connection with such previous employment. Although we try to ensure that our employees do not use the proprietary information or know-how of others in their work for us, we may be subject to claims that we or these employees have used or disclosed intellectual property, including trade secrets or other proprietary information, of any such third party. Litigation may be necessary to defend against such claims. If we fail in defending any such claims, in addition to paying monetary damages, we may lose valuable intellectual property rights or personnel or sustain damages. Such intellectual property rights could be awarded to a third party, and we could be required to obtain a license from such third party to commercialize our technology or products. Such a license may not be available on commercially reasonable terms or at all. Even if we are successful in defending against such claims, litigation could result in substantial costs and be a distraction to management.

In addition, while we typically require our employees, consultants and contractors who may be involved in the development of intellectual property to execute agreements assigning such intellectual property to us, we may be

unsuccessful in executing such an agreement with each party who in fact develops intellectual property that we regard as our own, which may result in claims by or against us related to the ownership of such intellectual property. If we fail in prosecuting or defending any such claims, in addition to paying monetary damages, we may lose valuable intellectual property rights. Even if we are successful in prosecuting or defending against such claims, litigation could result in substantial costs and be a distraction to our senior management and scientific personnel.

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

Competitors may infringe our patents, trademarks, copyrights or other intellectual property. To counter infringement or unauthorized use, we may be required to file infringement claims, which can be expensive and time consuming and divert the time and attention of our management and scientific personnel. In addition, our patents may become, involved in inventorship, priority, or validity disputes. To counter or defend against such claims can be expensive and time-consuming, and our adversaries may have the ability to dedicate substantially greater resources to prosecuting these legal actions than we can. Any claims we assert against perceived infringers could provoke these parties to assert counterclaims against us alleging that we infringe their patents, in addition to counterclaims asserting that our patents are invalid or unenforceable, or both.

In an infringement proceeding, a court may decide that a patent is invalid or unenforceable or may refuse to stop the other party from using the technology at issue on the grounds that our patents do not cover the technology in question. Accordingly, despite our efforts, we may not be able to prevent third parties from infringing upon or misappropriating intellectual property rights we own or control. An adverse result in any litigation proceeding could put one or more of our owned or in-licensed patents at risk of being invalidated or interpreted narrowly. Further, 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.

Even if resolved in our favor, the court may decide not to grant an injunction against further infringing activity and instead award only monetary damages, which may or may not be an adequate remedy. Litigation or other legal proceedings relating to intellectual property claims may cause us to incur significant expenses and could distract our personnel from their normal responsibilities. In addition, there could be public announcements of the results of hearings, motions, or other interim proceedings or developments, and 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. Such litigation or proceedings could substantially increase our operating losses and reduce the resources available for development activities or any future sales, marketing, or distribution activities.

We may not have sufficient financial or other resources to conduct such litigation or proceedings adequately. Some of our competitors may be able to sustain the costs of such litigation or proceedings more effectively than we can because of their greater financial resources and more mature and developed intellectual property portfolios. Uncertainties resulting from the initiation and continuation of patent litigation or other proceedings could have a material adverse effect on our ability to compete in the marketplace.

If our trademarks and trade names are not adequately protected, then we may not be able to build name recognition in our marks of interest and our business may be adversely affected.

Our trademarks or trade names may be challenged, infringed, circumvented or declared generic or determined to be infringing on other marks. We rely on both registration and common law protection for our trademarks. We may not be able to protect our rights to these trademarks and trade names or may be forced to stop using these names, which we need for name recognition by potential partners or customers in our markets of interest. During trademark registration proceedings, we may receive rejections. Although we would be given an opportunity to respond to those rejections, we may be unable to overcome such rejections. In addition, with the USPTO and with comparable agencies in many foreign jurisdictions, third parties are given an opportunity to oppose pending trademark applications and to seek to cancel registered trademarks. Opposition or cancellation proceedings may be filed against our trademarks, and our trademarks may not survive such proceedings. If we are unable to establish name recognition based on our trademarks and trade names, we may not be able to compete effectively and our business may be adversely affected.

ITEM 1B. ***Unresolved Staff Comments***

We do not have any unresolved comments issued by the SEC Staff.

ITEM 2. ***Properties***

We currently lease approximately 49,000 square feet of office and laboratory space in New York and Massachusetts, of which, approximately 45,000 square feet is attributable to a new sublease of office and laboratory space in Somerville, Massachusetts that we entered into in October 2022. We intend to begin building out the Somerville leased space in the second quarter of 2023, which we expect to be substantially complete during the fourth quarter of 2023. The terms of our leases expire from December 2026 through approximately December 2032. We believe that our leased property meets our current needs.

ITEM 3. ***Legal Proceedings***

From time to time, we become involved in litigation and arbitrations in the ordinary course of business. Legal fees and other costs associated with such actions are expensed as incurred. In addition, we assess the need to record a liability for litigation and contingencies. We reserve for costs relating to these matters when a loss is probable, and the amount can be reasonably estimated.

Dhesh Govender v. Eterna Therapeutics LLC, et al., Index No. 650847/2021 (N.Y. Sup. Ct. N.Y. Cty. 2021)

On or about February 5, 2021, Dhesh Govender, a former short-term consultant of Eterna LLC, filed a complaint against Eterna LLC and certain individuals that plaintiff alleged were directors of Eterna LLC. Plaintiff alleged that Eterna LLC and certain of its officers and directors (''Govender defendants'') engaged in unlawful and discriminatory conduct based on race, national origin and hostile work environment. Plaintiff also asserted various breach of contract, fraud and quantum meruit claims based on an alleged oral agreement pursuant to which he alleged Eterna LLC agreed to hire him as an executive once the Merger was completed. On December 15, 2022, the parties executed a Confidential Settlement Agreement and Release of All Claims. On January 11, 2023, the parties filed a Stipulation to Discontinue in the Court action. Also on January 11, 2023, Govender voluntarily dismissed the arbitration.

John Westman v. Novellus, Inc., Christopher Rohde, and Matthew Angel, Civil Action No. 2181CV01949 (Middlesex County (Massachusetts) Superior Court)

On or about September 7, 2021, John Westman, a former employee of Novellus, Inc. filed a Complaint in Middlesex County (Massachusetts) Superior Court against Novellus, Inc. and Novellus, Inc.'s founders and former executives, Dr. Christopher Rohde and Dr. Matthew Angel. The case includes allegations that Novellus, Inc. violated the Massachusetts Wage Act (''Wage Act''). Eterna acquired Novellus, Inc. on July 16, 2021. Mr. Westman's claims relate to alleged conduct that took place before Eterna acquired Novellus, Inc. Westman agreed to dismiss the lawsuit and proceed with his claims in arbitration. Following mediation, the parties settled this dispute in December 2022.

The aggregate settlement amount payable by the Company for the two matters discussed above is approximately $0.5 million.

Novellus, Inc. v. Sowyrda et al., C.A. No. 2184CV02436-BLS2

On October 25, 2021 Novellus, Inc. filed a complaint in the Superior Court of Massachusetts, Suffolk County, against former Novellus, Inc. employees Paul Sowyrda and John Westman and certain other former investors in Novellus LLC (Novellus, Inc.'s former parent company prior to our acquisition of Novellus, Inc.), alleging breach of fiduciary duty, breach of contract and civil conspiracy. Eterna acquired Novellus, Inc. on July 16, 2021. On May 27, 2022 Novellus, Inc. amended the complaint to withdraw all claims against all defendants except Paul Sowyrda and John Westman. On July 1, 2022, Westman filed a motion to compel arbitration or in the alternative, to stay the litigation pending the disposition of certain litigation in the Court of Chancery for the State of Delaware filed by Mr. Sowyrda against Novellus LLC, Dr. Christopher Rohde, Dr. Matthew Angel, Leonard Mazur and Factor Bioscience, Inc. captioned *Zelickson et al., v. Angel et al.,* C.A. 2021-1014-JRS and by Westman against Novellus LLC captioned *Westman v. Novellus LLC*, C.A. No. 2021-0882-NAC (the ''Delaware Actions''). On July 1, 2022, Sowyrda answered the complaint and asserted counterclaims against Novellus, Inc, and third-party defendants Dr. Matthew Angel and Dr. Christopher Rohde alleging violations of the Massachusetts Wage Act, Massachusetts Minimum Fair Wage Law, the Fair Labor Standards Act, breach of contract, unjust enrichment and quantum meruit. Sowyrda also joined in Westman's motion to stay the case pending the Delaware Actions. Novellus, Inc.'s claims and Mr. Sowyrda's counterclaims relate to alleged conduct that took place before Eterna acquired Novellus, Inc.

On November 15, 2022, prior to a decision on Westman's and Sowyrda's motion to compel or stay, the Parties agreed to voluntarily dismiss and consolidate the Delaware Actions with this action. On December 15, 2022, Sowyrda filed an Amended Answer to the Amended Complaint, asserted affirmative defenses and filed Amended Counterclaims against Dr. Angel, Dr. Rohde, Novellus LLC, Novellus Inc., Factor Bioscience Inc., and Eterna Therapeutics Inc. (''Counterclaim Defendants'') alleging against various Counterclaim Defendants breach of contract, breaches of the implied duty of good faith and fair dealing, breaches of fiduciary duty, breaches of the operating agreement, aiding and abetting breaches of fiduciary duty, tortious interference with contract, equitable accounting, violations of the Massachusetts Wage Act, Massachusetts Minimum Fair Wage Law, the Fair Labor Standards Act, unjust enrichment, and quantum meruit. Also on December 15, 2022, Westman filed an answer to the Amended Complaint and asserted similar counterclaims against the same Counterclaim Defendants. Westman and Sowyrda each asserted claims for indemnification and/or advancement against Novellus, Inc. On January 11, 2023, Westman and Sowyrda served a joint motion to enforce their advancement and/or indemnification rights against Novellus Inc. Novellus Inc. vigorously opposes this motion and served its opposition on January 27, 2023. On February 8, 2023, Westman and Sowyrda served a reply in support of their motion to enforce indemnification/advancement rights, and submitted the motion to the Court. Novellus Inc. answered Westman and Sowyrda's counterclaims on January 27, 2023, denying liability. The remaining Counterclaim Defendants served a motion to dismiss most of the remaining counterclaims on January 27, 2023. Sowyrda's and Westman's oppositions to the motion to dismiss were served on March 3, 2023, and Counterclaim Defendants' reply is due March 24, 2023, at which point the motion to dismiss will be fully briefed. The Court announced that it would hold oral argument on April 5, 2023 on (a) the Counterclaim Defendants' motion to dismiss, and (b) Sowyrda's and Westman's motion to enforce. The parties attended an initial status and scheduling conference with the Court on February 7, 2023. The Court deferred entering a case scheduling until after the April 5 hearing.

ITEM 4. ***Mine Safety Disclosures***

Not Applicable.

PART II

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

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

As of March 20, 2023, there were approximately 145 stockholders of record based on the actual number of holders registered on our books at such date.

We have 156,112 shares of Series A Preferred Stock issued and outstanding. The Series A Preferred Stock provides for a cumulative annual dividend of 10 cents per share, payable in semi-annual installments in June and December. Dividends may be paid in cash or in shares of our common stock. In 2022, we paid approximately $16,000 in cash dividends to the holders of our Series A Preferred Stock. We expect to pay the dividends on our Series A Preferred Stock in accordance with its terms, though we may elect to pay the dividend in shares of our common stock in the future.

We have not declared or paid any cash dividends on our common stock. No cash dividends have been previously paid on our common stock and none are anticipated in 2023.

For information regarding securities authorized for issuance under our equity compensation plans, see Part III, Item 12, ''Security Ownership of Certain Beneficial Owners and Management and Related Stockholder Matters.''

ITEM 6. *[Reserved]*

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

This Annual Report on Form 10-K contains forward-looking statements within the meaning of the Private Securities Litigation Reform Act of 1995 (''PSLRA''), Section 27A of the Securities Act of 1933, as amended, (the ''Securities Act''), and Section 21E of the Exchange Act, about our expectations, beliefs, or intentions regarding our product development efforts, business, financial condition, results of operations, strategies and prospects. You can identify forward-looking statements by the fact that these statements do not relate to historical or current matters. Rather, forward-looking statements relate to anticipated or expected events, activities, trends or results as of the date they are made. Because forward-looking statements relate to matters that have not yet occurred, these statements are inherently subject to risks and uncertainties that could cause our actual results to differ materially from any future results expressed or implied by the forward-looking statements. Many factors could cause our actual activities or results to differ materially from the activities and results anticipated in forward-looking statements. These factors include those contained in ''Item 1A — Risk Factors'' of this Annual Report on Form 10-K. We do not undertake any obligation to update forward-looking statements except as required by applicable law. We intend that all forward-looking statements be subject to the safe harbor provisions of PSLRA. These forward-looking statements reflect our views only as of the date they are made.

Overview

We are a preclinical-stage biopharmaceutical company committed to realizing the potential of mRNA cell engineering to provide patients with transformational new medicines. We have in-licensed a portfolio of over 100 patents covering key mRNA cell engineering technologies, including technologies for mRNA cell reprogramming, mRNA gene editing, the NoveSlice™ and UltraSlice™ gene-editing proteins, and the ToRNAdo™ mRNA delivery system, which we collectively refer to as our ''mRNA technology platform.'' We plan to develop and advance a pipeline of therapeutic products, both internally and through strategic partnerships, with the near-term focus on deploying our mRNA technology platform through strategic partnerships. We license our mRNA technology platform from Factor Limited under an exclusive license agreement.

Basis of Presentation

Revenues

We are a pre-clinical stage company and have had no revenues from product sales to date. We will not have revenues from product sales until such time as we receive regulatory approval of our product candidates, successfully commercialize our products or enter into a licensing agreement with respect to our intellectual property, which may include up-front licensing fees, of which there can be no assurance.

Research and Development Expenses

We expense our research and development costs as incurred. Our research and development expenses consist of costs incurred for company-sponsored research and development activities, as well as support for selected investigator-sponsored research. Upfront payments and milestone payments for the licensing of technology are expensed as research and development in the period in which they are incurred if the technology is not expected to have any alternative future uses other than the specific research and development project for which it was intended. In-process research and development (''IPR&D'') that we acquire and which has no alternative future uses and, therefore, no separate economic values, is expensed to research and development costs at the time the costs are incurred.

The major components of research and development costs have included preclinical study costs, clinical manufacturing costs, clinical study and trial expenses, insurance coverage for clinical trials, expensed licensed technology, consulting, scientific advisors and other third-party costs, salaries and employee benefits, stock-based compensation expense, supplies and materials and allocations of various overhead costs related to our product development efforts.

We have contracted with third parties to perform various clinical study and trial activities in the development and testing of potential products. The financial terms of these agreements vary from contract to contract and may result in uneven payment flows. We accrue for third party expenses based on estimates of the services received and efforts expended during the reporting period. If the actual timing of the performance of the services or the level of effort varies from the estimate, the accrual is adjusted accordingly. The expenses for some third-party services may be recognized on a straight-line basis if the expected costs are expected to be incurred ratably during the period.

Payments under the contracts depend on factors such as the achievement of certain events or milestones, the successful enrollment of patients, the allocation of responsibilities among the parties to the agreement, and the completion of portions of the clinical study or trial or similar conditions. Preclinical and clinical study and trial associated activities such as production and testing of clinical material require significant up-front expenditures.

General and Administrative Expenses

Our general and administrative expenses consist primarily of salaries, benefits and other costs, including equity-based compensation, for our executive and administrative personnel, legal and other professional fees, travel, insurance, and other corporate costs.

Comparison of the Years Ended December 31, 2022 and 2021

	Years ended December 31,		
	2022	2021	Change
(in thousands)			
Operating expenses:			
Research and development	$ 10,392	$ 12,705	$ (2,313)
Impairment of in-process research and development	5,990	—	5,990
In-process research and development	—	80,538	(80,538)
General and administrative	16,835	14,724	2,111
Transaction costs	—	5,765	(5,765)
Total operating expenses	33,217	113,732	(80,515)
Loss from operations	(33,217)	(113,732)	80,515
Other income (expense), net:			
Loss on sale of NTN assets	—	(9,648)	9,648
Change in fair value of warrant liabilities	10,795	—	10,795
Loss on non-controlling investment	(941)	—	(941)
Other (expense) income, net	(1,171)	899	(2,070)
Total other income (expense), net	8,683	(8,749)	17,432
Loss before income taxes	(24,534)	(122,481)	97,947
Provision for income taxes	(45)	(64)	19
Net loss	$(24,579)	$(122,545)	$ 97,966

Research and Development Expenses

	Years ended December 31,		
	2022	2021	Change
(in thousands)			
License and MSA expense	$ 4,761	$ 6,500	$(1,739)
Payroll-related	2,426	2,342	84
Stock-based compensation	1,249	1,597	(348)
Clinical	1,047	1,292	(245)
Other expenses, net	909	974	(65)
Total research and development expenses	$10,392	$12,705	$(2,313)

For the year ended December 31, 2022, our research and development expenses decreased primarily due to a reduction in license expenses under the Original Factor License Agreement, less stock-based compensation expense

due to forfeitures of stock options and restricted stock units, and lower clinical trial expense. These reductions were offset by expenses incurred related to the MSA, which was not in place in the prior year, and other miscellaneous expense during 2022 when compared to the year ended December 31, 2021.

Impairment of In-Process Research and Development

As discussed in Part I, Item 1 of this Annual Report on Form 10-K, in June 2022, we received the results from the INSPIRE phase 2 trial of IRX-2. The IRX-2 multi-cytokine biologic immunotherapy represents substantially all the fair value assigned to the technologies of IRX that we acquired in 2018. Despite outcomes that favored IRX-2 in certain predefined subgroups, the INSPIRE trial did not meet the primary endpoint of Event-Free Survival (EFS) at two years of follow up. Significant additional clinical development work would be required to advance IRX-2 in the form of additional Phase 2 and 3 studies to further evaluate the treatment effect of IRX-2 in patient subgroups and in combination with checkpoint inhibitor therapies. The INSPIRE trial is the only Company-sponsored study of IRX-2. IRX-2 has been studied externally in other clinical settings outside of head and neck cancer in the form of investigator sponsored trials, which have either ended or are not currently active. Based on the totality of available information, we currently do not have plans to further develop the IRX-2 product candidate. As such, we determined that the carrying value of the IPR&D asset was impaired and recognized a non-cash impairment charge of approximately $6.0 million for the year ended December 31, 2022. There was no similar impairment charge for the year ended December 31, 2021.

In-Process Research and Development

During the year ended December 31, 2021, we expensed the $80.5 million fair value of IPR&D acquired in the Novellus Acquisition because there was no future alternative use for the IPR&D other than for its intended purpose. There was no similar transaction for the year ended December 31, 2022.

General and Administrative Expenses

	Years ended December 31,		
	2022	2021	Change
(in thousands)			
Professional fees	$ 8,499	$ 7,351	$ 1,148
Payroll-related	2,942	1,299	1,643
Insurance	1,951	1,134	817
Stock-based compensation	1,686	3,638	(1,952)
Loss on disposal or sale of fixed assets	280	—	280
Other expenses, net	1,477	1,302	175
Total general and administrative expenses	$16,835	$14,724	$ 2,111

The increase in general and administrative expense for the year ended December 31, 2022 primarily related to increased legal fees, settlements related to certain legal matters and increased headcount, as well as severance expense for certain employees, including our former Chief Executive Officer, who resigned effective May 26, 2022. Other increases included premiums for public company insurance policies and losses on the disposal or sale of fixed assets, as compared to the same period in 2021. These increases were offset by decreased stock-based compensation expense due primarily to forfeitures of stock options and restricted stock units as compared to the year ended December 31, 2021.

Transaction Costs

For the year ended December 31, 2021, we incurred approximately $5.8 million in transaction costs related to the issuance of common stock to Eterna LLC's financial advisor upon consummation of the Merger, and there were no comparable transaction costs for the year ended December 31, 2022.

Loss on Sales of NTN Assets

We incurred a $9.6 million loss on the sale of NTN assets for year ended December 31, 2021 in connection with the Disposition, and there were no comparable transaction costs for the year ended December 31, 2022.

Change in Fair Value of Warrant Liabilities

For the year ended December 31, 2022, we recognized a credit of $11.4 million for the change in the fair value of warrant liabilities, which was offset by $0.6 million in expense related to the excess fair value of the Q1-22 Common Warrants and Q1-22 Pre-Funded Warrant (as defined below) issued in connection with the Q1-22 PIPE Transaction (as defined below) over the $12.0 million gross proceeds received. There were no comparable credits or expenses for the year ended December 31, 2021.

Loss on Non-Controlling Investment

We account for our investment in NoveCite under the equity method. During the year ended December 31, 2022, we recognized approximately $0.9 million of loss on our 25% non-controlling investment in NoveCite. Of the $0.9 million loss for the year ended December 31, 2022, $0.5 million related to NoveCite's results of operations for the year ended December 31, 2021. We have not guaranteed obligation of NoveCite nor are we otherwise committed to provide any financial support for NoveCite. Therefore, we will record losses only up to our investment carrying amount. There was no comparable loss for the year ended December 31, 2021.

Other (Expense) Income, Net

	Years ended December 31,		
	2022	2021	Change
(in thousands)			
Q1-22 PIPE transaction fees	$(1,007)	$ —	$(1,007)
Liquidated damages	(240)	—	(240)
Interest expense, net	(30)	(74)	44
PPP Loan forgiveness and ERC refunds	—	974	(974)
Other income, net	106	(1)	107
Total other (expense), income net	$(1,171)	$899	$(2,070)

For the year ended December 31, 2022, the increase in other expense, net was primarily due to fees related to the Q1-22 PIPE Transaction (as defined below), which were allocated to the warrants issued in connection with the transaction. Additionally, we recorded a loss related to the liquidated damages we incurred under our registration rights agreement with the Q1-22 PIPE Investor (as defined below) as a result of not timely filing with the SEC our Quarterly Report on Form 10-Q for the quarter ended March 31, 2022. These increases in expense to the year ended December 31, 2022 were offset by income from the sale of certain fixed assets and a decrease in interest expense when compared to the year ended December 31, 2021. During the year ended December 31, 2021, we recognized income from the forgiveness of our Paycheck Protection Program loan and for payroll tax refunds under the Employee Retention Credit program, both of which were under the Coronavirus Aid, Relief, and Economic Security Act administered by the U.S. Small Business Administration (the "CARES Act"). We did not receive any such income for the year ended December 31, 2022.

Provision for Income Taxes

We recognized a provision for income taxes of approximately $45,000 and $64,000 for the years ended December 31, 2022 and 2021, respectively. Our income tax provision is primarily for U.S. state income tax. At December 31, 2022 and 2021, we had available net operating loss ("NOL") carryforwards of approximately $35.6 million and $20.7 million for federal income tax purposes, respectively, of which $35.6 million can be carried forward indefinitely. We have available $28.8 million and $20.7 million of state NOLs for the years ended December 31, 2022 and 2021, respectively, which begin to expire in 2041. We also have foreign NOL carryforwards of $6.3 million and $4.8 million for the years ended December 31, 2022 and 2021, respectively, which carry forward indefinitely. Section 382 of the Internal Revenue Code ("IRC") imposes limits on the ability to use NOL carryforwards that existed prior to a change in control to offset future taxable income. Such limitations would reduce, potentially significantly, the gross deferred tax assets disclosed in the table above related to the NOL carryforwards. We continue to disclose the NOL carryforwards at their original amount in the table above as no potential limitation has been quantified. We have also established a full valuation allowance for all deferred tax assets, including the NOL carryforwards, since we could not conclude that we were more likely than not able to generate future taxable income to realize these assets.

Liquidity and Capital Resources

At December 31, 2022, we had cash and cash equivalents of approximately $15.5 million, of which approximately $4.1 million was restricted cash, as discussed below.

On March 6, 2022, we entered into a securities purchase agreement (the ''Q1-2022 Purchase Agreement'') with an investor (the ''Q1-22 PIPE Investor''), providing for the private placement (the ''Q1-22 PIPE Transaction'') to the Q1-22 PIPE Investor of approximately 343,000 units, each unit consisting of (i) one share of our common stock (or, in lieu thereof, one pre-funded warrant (each, a ''Q1-22 Pre-Funded Warrant'') to purchase one share of common stock) and (ii) one warrant (each, a ''Q1-22 Common Warrant'') to purchase one share of common stock, for an aggregate gross purchase price of approximately $12.0 million. The Q1-22 PIPE Transaction closed on March 9, 2022 for net proceeds of approximately $11.0 million. The Q1-22 PIPE Investor exercised all of the Q1-22 Pre-Funded Warrants on July 12, 2022 at an exercise price of $0.10 per share for total proceeds of approximately $7,000. Pursuant to Q1-22 Purchase Agreement, we are prohibited from issuing equity in variable rate transactions for a period of one-year following consummation of the Q1-22 PIPE Transaction, including issuing equity under the Second Purchase Agreement (as defined below).

On October 18, 2022, we entered into a facility sublease agreement (the ''Sublease'') for approximately 45,500 square feet of office and laboratory space in Somerville, Massachusetts. The term of the Sublease is approximately 10 years, and we will pay approximately $63.0 million in base rental payments over the 10-year term, plus our share of the Sublessor's parking spaces and operating expenses. As part of the Sublease, we delivered a security deposit in the form of a letter of credit in the amount of $4.1 million, which will be reduced on an incremental basis throughout the term of the lease. The letter of credit was issued by our commercial bank, which required that we cash collateralize the letter of credit with $4.1 million of cash deposited in a restricted account maintained by such bank. The amount of required restricted cash collateral will decline in parallel with the reduction in the amount of the letter of credit over the term of the sublease. The amount of restricted cash reduces by an equal amount our available working capital.

On November 23, 2022, we entered into a securities purchase agreement (the ''Q4-22 Purchase Agreement'') with certain investors (the ''Q4-22 PIPE Investors''), providing for the private placement (the ''Q4-22 PIPE Transaction'') to the Q4-22 Investors of approximately 2,185,000 units, each unit consisting of (i) one share of common stock and (ii) two warrants, each exercisable to purchase one share of common stock at an exercise price of $3.28 per share (the ''Q4-22 Warrants''), at a purchase price of $3.53 per unit (inclusive of $0.125 per Q4-22 Warrant), for net proceeds of approximately $7.4 million.

In April 2021, we and an investment group (the ''Investment Group'') executed a purchase agreement (the ''First Purchase Agreement''), pursuant to which we had the right, but not the obligation, to sell to the Investment Group, and the Investment Group was obligated to purchase, up to $20.0 million of shares of our common stock. Sales of common stock by us were subject to certain limitations, and could occur from time to time, at our sole discretion. In consideration for the Investment Group's entry into the First Purchase Agreement, we issued the Investment Group approximately 3,000 shares of common stock. As of December 31, 2022, we had issued and sold to the Investment Group approximately 56,000 shares of common stock under the First Purchase Agreement for gross proceeds of $20.0 million, and no further shares may be sold to the Investment Group under the First Purchase Agreement.

In May 2021, we and the Investment Group executed a second purchase agreement (the ''Second Purchase Agreement''), pursuant to which we have the right, but not the obligation, to sell to the Investment Group, and the Investment Group would be obligated to purchase, up to $40.0 million of shares of our common stock. Sales of common stock by us are subject to certain limitations, and may occur from time to time, at our sole discretion. In consideration of the Investment Group's entry into the Second Purchase Agreement, we issued to the Investment Group 50,000 shares of common stock.

Actual sales of shares of common stock to the Investment Group under the Second Purchase Agreement depend on a variety of factors to be determined by us from time to time, including, among others, market conditions, the trading price of the common stock and determinations by us as to the appropriate sources of funding for us and our operations.

As of December 31, 2022, we had issued and sold approximately 121,000 shares of common stock under the Second Purchase Agreement for total gross proceeds of $34.1 million. Pursuant to the securities purchase agreement in respect of the Q1-22 PIPE Transaction, we were prohibited from issuing additional shares under the Second Purchase Agreement for a period of one-year immediately following the closing of the Q1-22 PIPE Transaction.

We have to date incurred operating losses, and we expect these losses to continue in the future as we further develop our product development programs and operate as a publicly traded company. In the near-term, we intend to focus on licensing opportunities for our in-licensed technology, but there can be no assurance that we will enter into agreements with respect to such opportunities on such terms and within a timeframe necessary to satisfy our need for working capital. While we are not presently pursuing product development, we may do so in the future, and current and potential licensing partners may seek to do so. Developing product candidates, conducting clinical trials and commercializing products are expensive, and we would need to raise substantial additional funds if we were to pursue the development of one or more product candidates Based on our current financial condition and forecasts of available cash, we believe we do not have sufficient funds to fund our operations for the next twelve months from the filing of the financial statements contained in this Annual Report on Form 10-K for the year ended December 31, 2022. We can provide no assurance that we will be able to satisfy our near- or long-term cash needs through licensing transactions, or that we will obtain any additional financing that we require in the future or, even if such financing is available, that it will be obtainable on terms acceptable to us.

In that regard, our future funding requirements will depend on many factors, including:

- the terms and timing of any collaborative, licensing and other agreements that we may establish;
- the cost of filing and potentially prosecuting, defending and enforcing any patent claims and other intellectual property rights;
- the cost and timing of regulatory approvals;
- the cost and delays in product development as a result of any changes in regulatory oversight applicable to our products;
- the cost and timing of establishing sales, marketing and distribution capabilities;
- the effect of competition and market developments;
- the scope, rate of progress and cost of clinical trials and other product development activities; and
- future clinical trial results.

We plan to raise additional funds to support our product development activities and working capital requirements through public or private equity offerings, debt financings, strategic partnerships, out-license collaborations or other means. Any sale by us of additional equity or convertible debt securities could result in dilution to our stockholders. There can be no assurance that any such required additional funding will be available to us at all or available on terms acceptable to us.

Further, to the extent that we raise additional funds through collaborative arrangements, it may be necessary to relinquish some rights to our technologies or grant sublicenses on terms that are not favorable to us. If we are not able to secure additional funding when needed, we may have to delay the commercialize of our products, reduce the scope of or eliminate one or more research and development programs, which could have an adverse effect on our business.

Cash Flows

Cash flows from operating, investing and financing activities, as reflected in the accompanying consolidated statements of cash flows, are summarized as follows:

	For the years ended December 31,		
(in thousands)	**2022**	**2021**	**Change**
Cash (used in) provided by:			
Operating activities	$(20,976)	$(23,488)	$ 2,512
Investing activities	(47)	(22,742)	22,695
Financing activities	19,579	61,585	(42,006)
Net (decrease) increase in cash and cash equivalents	$ (1,444)	$ 15,355	$(16,799)

Net Cash Used in Operating Activities

The decrease in cash used in operating activities was due to a decrease in net loss of $3.5 million, after giving effect to adjustments made for non-cash transactions, offset by an increase in cash provided by operating assets and

liabilities of $6.0 million during the year ended December 31, 2022 compared to the year ended December 31, 2021. The decrease in cash used in operations was primarily driven by increased accrued compensation due to severance accruals, accrued costs for litigation matters, amounts due to related party for the License Fee Obligation and increased insurance liabilities.

Net Cash Used in Investing Activities

The decrease in net cash used in investing activities was primarily due to $22.9 million of cash used to purchase Novellus during the year ended December 31, 2021, which was offset by proceeds of approximately $0.3 million from the Merger and the Disposition. There were no similar transactions during the year ended December 31, 2022.

Net Cash Provided by Financing Activities

The decrease in net cash provided by financing activities was primarily the result of a decrease in net proceeds from capital raising transactions of approximately $42.9 million, net, offset by a decrease in principal payments made for long-term debt arrangements of $0.9 million during the year ended December 31, 2022 compared to the year ended December 31, 2021.

Critical Accounting Estimates

Our discussion and analysis of our financial condition and results of operations are based on our consolidated financial statements, which have been prepared in accordance with U.S. GAAP. The preparation of these consolidated financial statements requires us to make judgments, estimates, and assumptions that affect the reported amounts of assets and liabilities and the disclosure of contingent assets and liabilities at the date of the consolidated financial statements, as well as the reported expenses during the reporting periods. We continually evaluate our judgments, estimates and assumptions. We base our estimates on the terms of underlying agreements, our expected course of development, historical experience and other factors we believe are reasonable based on the circumstances, the results of which form our management's basis for making judgments about the carrying value of assets and liabilities that are not readily apparent from other sources. Actual results may differ from these estimates. We believe the following critical accounting estimates affect our more significant judgments and estimates used in the preparation of our consolidated financial statements.

Goodwill Impairment

Goodwill represents the excess of the purchase price over the fair value of identifiable net assets acquired in the acquisition of IRX Therapeutics, Inc. in November 2018 (the ''IRX Acquisition''), which was accounted for as a business combination. Goodwill is not amortized but is tested for impairment annually, or if events occur or circumstances change that would reduce the fair value of a reporting unit below its carrying value. Since management evaluates Eterna as a single reporting unit, goodwill is tested for impairment at the entity level by first performing a qualitative assessment to determine whether it is more likely than not that the fair value of the entity is less than its carrying value. Such qualitative factors include macroeconomic conditions, industry and market considerations, cost factors, overall financial performance and other relevant events. If the entity does not pass the qualitative assessment, then the entity's carrying value is compared to its fair value. Goodwill is considered impaired if the carrying value of the entity exceeds its fair value.

Recent Accounting Pronouncements

Newly Adopted Accounting Standards

In July 2021, the FASB issued Accounting Standards Update (''ASU'') 2021-05, *Leases (Topic 842) – Lessors - Certain Leases with Variable Lease Payments,* which amends the lessor classification guidance to introduce additional criteria when classifying leases with variable lease payments that do not depend on a reference index or a rate. We adopted this ASU effective January 1, 2022, which did not have a material impact on our financial statements.

In May 2021, the FASB issued ASU 2021-04*, Earnings Per Share (Topic 260), Debt—Modifications and Extinguishments (Subtopic 470-50), Compensation—Stock Compensation (Topic 718), and Derivatives and Hedging—Contracts in Entity's Own Equity (Subtopic 815-40): Issuer's Accounting for Certain Modifications or*

Exchanges of Freestanding Equity-Classified Written Call Options. ASU 2021-04 addresses the accounting for certain modifications or exchanges of freestanding equity-classified written call options. We adopted this ASU effective January 1, 2022, which did not have a material impact on our financial statements.

In November 2021, the FASB issued ASU 2021-10, *Disclosures by Business Entities about Government Assistance,* which requires a business entity to disclose information about certain government assistance that it has received, including (i) the type of assistance, (ii) an entity's accounting for the assistance and (iii) the effect of the assistance on the entities accounting statements. We adopted this standard effective January 1, 2022, which did not have a material impact on the Company's financial statements. We have approximately $0.6 million in payroll tax refunds recorded in other receivable on the accompanying consolidated balance sheets as of December 31, 2022 and 2021 pursuant to the Employee Retention Credit program under the CARES Act.

Accounting Standard to be Adopted

In June 2022, the FASB issued ASU No. 2022-03, *Fair Value Measurement (Topic 820): Fair Value Measurement of Equity Securities Subject to Contractual Sale Restrictions* (''ASU 2022-03''). The FASB issued ASU 2022-03 to (1) clarify the guidance in Topic 820, Fair Value Measurement, when measuring the fair value of an equity security subject to contractual restrictions that prohibit the sale of an equity security, (2) to amend a related illustrative example, and (3) to introduce new disclosure requirements for equity related securities subject to contractual sale restrictions that are measured at fair value in accordance with Topic 820. ASU 2022-03 clarifies that a contractual restriction on the sale of an equity security is not considered part of the unit of account of the equity security and, therefore, is not considered in measuring fair value. The guidance is effective for fiscal years beginning after December 15, 2023, and interim periods within those fiscal years with early adoption permitted. We are evaluating when to adopt the amendments in ASU 2022-02. We do not expect a material impact as a result of adopting this amendment.

ITEM 7A. *Quantitative and Qualitative Disclosures about Market Risk*

Under SEC rules and regulations, as a smaller reporting company we are not required to provide the information otherwise required by this item.

ITEM 8. *Financial Statements and Supplementary Data*

See ''Index to Consolidated Financial Statements'' on page F-1 for a listing of the Consolidated Financial Statements filed with this Annual Report on Form 10-K.

ITEM 9. ***Changes in and Disagreements with Accountants on Accounting and Financial Disclosure***

None.

ITEM 9A. ***Controls and Procedures***

Disclosure Controls and Procedures

We maintain ''disclosure controls and procedures,'' as such term is defined under Rule 13a-15(e) promulgated under the Exchange Act, designed to ensure that information required to be disclosed in our reports filed pursuant to the Exchange Act is recorded, processed, summarized and reported within the time periods specified in the SEC's rules and forms, and that such information is accumulated and communicated to our management, including our principal executive officer and our principal financial officer, as appropriate, to allow timely decisions regarding required disclosures.

In designing and evaluating the disclosure controls and procedures, we recognized that any controls and procedures, no matter how well designed and operated, can provide only reasonable assurance of achieving the desired control objectives, and we were required to apply our judgment in evaluating the cost-benefit relationship of possible controls and procedures. We have carried out an evaluation as of the end of the period covered by this Annual Report on Form 10-K under the supervision, and with the participation, of our management, including our Chief Executive Officer and President (who serves as our principal executive officer) and our Chief Financial Officer (who serves as our principal financial officer), of the effectiveness of the design and operation of our disclosure controls and procedures.

Based on that evaluation, our Chief Executive Officer and Chief Financial Officer concluded that our disclosure controls and procedures were not effective as of the end of the period covered by this Annual Report on Form 10-K in providing reasonable assurance of achieving the desired control objectives due primarily to the material weakness discussed below.

Management's Report on Internal Control over Financial Reporting

Our management is responsible for establishing and maintaining adequate internal control over financial reporting. Our internal control over financial reporting is a process designed to provide reasonable assurance regarding the reliability of financial reporting and the preparation of financial statements for external purposes in accordance with generally accepted accounting principles.

Management, under the supervision of and with the participation of our Chief Executive Officer and our Chief Financial Officer, conducted an evaluation of the effectiveness of our internal control over financial reporting as of December 31, 2022 based on the framework and criteria established in Internal Control — Integrated Framework (2013) issued by the Committee of Sponsoring Organizations of the Treadway Commission. Based on such evaluation, management concluded that the Company's internal control over financial reporting was not effective as of December 31, 2022 due to the material weakness described below.

We were unable to timely file our Q1 2022 10Q with the SEC due to identifying errors in our financial statements reported in the Annual Report on Form 10-K for the years ended December 31, 2021 and 2020 during our preparation of the financial statements for the quarter ended March 31, 2022. Management concluded that the errors were the result of accounting personnel's lack of technical proficiency in complex matters. We filed an amendment to our Annual Report on Form 10-K/A for the years ended December 31, 2021 and 2020 on June 30, 2022 to correct the errors in our financial statements for the years ended December 31, 2021 and 2020 and for the quarters ended June 30, 2020, September 30, 2020, March 31, 2021, June 30, 2021 and September 30, 2021.

Management's Plan for Remediation of the Material Weakness in Internal Control over Financial Reporting

Management is implementing measures designed to ensure that the deficiencies contributing to the ineffectiveness of our internal control over financial reporting are promptly remediated, such that the internal controls are designed, implemented and operating effectively. The remediation actions include:

- enhancing the business process controls related to reviews over technical, complex, and non-recurring transactions; and
- providing additional training to accounting personnel; and
- consulting with an accounting advisor for technical, complex and non-recurring matters, with whom we have engaged and begun consulting.

The material weakness cannot be considered remediated until the applicable remedial controls operate for a sufficient period of time and management has concluded, through testing, that these controls are operating effectively.

We are committed to developing a strong internal control environment, and we believe the remediation efforts that we have implemented and will implement will result in significant improvements in our control environment. Our management will continue to monitor and evaluate the relevance of our risk-based approach and the effectiveness of our internal controls and procedures over financial reporting on an ongoing basis and is committed to taking further action and implementing additional enhancements or improvements, as necessary.

Remediation of Previously Identified Material Weakness

We have previously identified and disclosed the following material weakness in our internal control over financial reporting for the year ended December 31, 2021:

- Upon completion of the Merger in March 2021 and the resulting change in our business model and strategy, we experienced a complete turnover of our employees, including all of the members of our executive management team, which resulted in, among other things, our having insufficient accounting staff available to enable and ensure adequate segregation of duties and our lacking appropriate and complete documentation of policies and procedures critical to the accomplishment of financial reporting objectives. The accounting personnel and documentation deficiencies each increase the risk that a material misstatement of our financial statements will not be prevented or detected on a timely basis.

As of December 31, 2022, management sufficiently completed its remediation of this material weakness by taking the following measures:

- Increased the number of accounting personnel and reallocated and/or reassigned roles and responsibilities of users to accommodate increased personnel;
- Completed a comprehensive risk assessment to identify, design, and implement our internal controls;
- Implemented improvement and refinement of our internal controls related to our review of users with access to its key financial systems, specifically to validate and evidence that all users were subject to review and access was appropriate;
- Refined our review of user access controls which restrict system users from having access to create and post journal entries; and
- Completed the documentation, review, and enhancement of business policies, procedures, and related internal controls to standardize business processes.

We have completed the documentation and review of the corrective actions described above, and our management has concluded that the design and operation of our financial reporting processes as it relates to segregation of duties and documentation of policies and procedures is effective and therefore that the related previously identified material weakness has been fully remediated as of December 31, 2022.

Changes in Internal Control over Financial Reporting

As described above, there was a change in our internal control over financial reporting during the most recent fiscal quarter that has materially affected, or is reasonably likely to materially affect, our internal control over financial reporting.

ITEM 9B. ***Other Information***

Not Applicable.

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

Not Applicable.

PART III

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

DIRECTORS & EXECUTIVE OFFICERS

The names of our directors and executive officers and their respective ages, positions, biographies and, in the case of directors, their qualifications to serve as directors, are set forth below as of March 20, 2023.

Name	Age	Position[(1)]
Matthew Angel	42	President and Chief Executive Officer and Director
Andrew Jackson	54	Chief Financial Officer
Sandra Gurrola	56	Vice President, Finance
Charles Cherington	60	Chairman of the Board
Gregory Fiore	53	Director
William Wexler	63	Director
Nicholas J. Singer	43	Director

Matthew Angel, Ph.D., has served as Chief Executive Officer since January 1, 2023 and as Interim President, Chief Executive Officer and one of our directors since May 2022. Prior to that, Dr. Angel co-founded Factor Bioscience, and has served as its President, Chief Executive Officer and Chairman of its Board of Directors from since 2011. In 2020, Dr. Angel co-founded Exacis, for which he serves as the Scientific Advisory Board Chair. Dr. Angel previously served as the Chief Science Officer, Secretary, Treasurer and as a director of Exacis and as the Chief Science Officer, Secretary and as a director of Novellus from 2014 until the sale of Novellus to us in July 2021. Dr. Angel received a Ph.D. from the Massachusetts Institute of Technology in 2012 and a B.S. in Engineering from Princeton University in 2003.

Dr. Angel's qualifications to serve on our Board include his expertise in the healthcare industry, his business training and education, and his extensive experience managing biotechnology companies.

Andrew Jackson has served as our Chief Financial Officer since May 2022. Prior to that, Mr. Jackson served as the Chief Financial Officer of Ra Medical Systems, Inc. from April 2018 until May 2022, and as its Secretary from August 2021 to May 2022. From October 2016 to April 2018, he was Chief Financial Officer for AltheaDx, Inc, a molecular diagnostics company specializing in precision medicine. From March 2014 to March 2016, Mr. Jackson held senior financial positions, including Chief Financial Officer, at Celladon Corporation, a publicly traded, clinical stage biotechnology company. From April 2013 to March 2014, he held senior financial positions at Sapphire Energy, an industrial biotechnology company. Mr. Jackson received a MSBA in Finance in December 2006 from San Diego State University and a BSB in Accounting in June 1992 from the University of Minnesota. Mr. Jackson is also a certified public accountant (inactive).

Sandra Gurrola has served as our Vice President of Finance since June 2021. Prior to that, she served as the Senior Vice President of eGames.com Holdings, LLC from March 2021 to June 2021 and as a consultant to us. Ms. Gurrola served as Senior Vice President of Finance to NTN Buzztime, Inc. from September 2019 to March 2021 and its Vice President of Finance from 2014 until 2019. From 2009 to 2014, Ms. Gurrola served NTN Buzztime, Inc. in various leadership accounting roles, including Controller, Director of Accounting, and Director of Financial Reporting and Compliance. Previously, she was a senior manager of financial reporting for Metabasis Therapeutics, Inc., a biotechnology company. Ms. Gurrola received a B.A. in English from San Diego State University.

Charles Cherington, Chairman, has served on our Board of Directors since March 2021. Prior to that, Mr. Cherington served on our board of managers from 2018 through 2021. Mr. Cherington is a Co-Founder and Managing Partner of Ara Partners, a global private equity firm focused on industrial decarbonization investments founded in 2017. Previously, Mr. Cherington co-founded and served as Managing Partner of Intervale Capital, a middle-market private equity firm focused on investments in energy and infrastructure sectors, from 2006 to 2017. Mr. Cherington was Founder and Sole Partner of Cherington Capital, a private equity firm, from 2002 to 2006. In 1999, Mr. Cherington co-founded Paratus Capital Management, LLC, a venture capital firm, where he served as Partner until 2004. Prior to 1999, Mr. Cherington served in various positions with Lochridge & Company, Inc., a business management consulting firm, and as an investment banker for Credit Suisse First Boston. Mr. Cherington received a B.A. in History from Wesleyan University and an M.B.A. from the University of Chicago.

Mr. Cherington's qualifications to serve on our Board of Directors include his extensive experience and senior management roles in companies in the life sciences and private equity industries, and his business training and education.

Gregory Fiore, M.D., has served on our Board of Directors since June 2022. Dr. Fiore has served as a director and as the President and Chief Executive Officer of Exacis since June 2020. Dr. Fiore co-founded Sollis Therapeutics ("Sollis"), a clinical-stage pharmaceutical company, where he served as President, Chief Executive Officer and Director from 2017 to 2019 and as Vice President and Chief Medical Officer from 2019 to 2020. Prior to Sollis, Dr. Fiore provided senior medical support as a consultant and acting Chief Medical Officer for various early-stage biotechnology companies through the following private healthcare consulting firms he founded, Fiore Healthcare Advisors, SSI Strategy and GJFMD Consulting. Dr. Fiore was also the Chief Medical Officer of The Medicines Company (NASDAQ: MDCO), held leadership roles at Merck & Co., Inc. (NYSE: MRK) and Abbott Laboratories (NYSE: ABT) and was a management consultant at McKinsey and Company. Dr. Fiore has served as a member of the Business Advisory Board for The Advanced Group of Companies since 2017. Dr. Fiore completed his Internal Medicine internship and residency at Harvard Medical School and received his MD degree from New York Medical College.

Dr. Fiore's qualifications to serve on our Board include his extensive background in the healthcare and pharmaceutical industries, and his medical education and training.

William Wexler has served on our Board of Directors since June 2022. Prior to joining our Board of Directors, Mr. Wexler worked on over 150 individual projects, serving in various capacities including as Chairman, Chief Executive Officer, Chief Restructuring Officer and other designated roles of senior responsibility. Mr. Wexler has served as the Managing Member of WEXLER Consulting LLC, a management consulting firm, since 2012. From 2012 to 2019, he served in various roles, including as Chairman of the Board, interim Chief Executive Officer, Chief Executive Officer and sole director and stockholder representative of Upstate New York Power Products, Inc., a holding company that owned and operated power plants throughout upstate New York. From 2012 to 2013, Mr. Wexler served as Chief Restructuring Officer of VMR Electronics, LLC, a manufacturer of cable assembly products for the electronics interconnect industry. Prior to that, he served as a Managing Director and national finance practice lead at BBK, Ltd., a turn-around advisory firm, from 2006 to 2011. Mr. Wexler served as group Managing Director of corporate restructuring at Huron Consulting Group, LLC from 2002 to 2005. Previously, he was a Managing Director at Berenson Minella & Co., a boutique investment-banking firm, from 2000 to 2002. Between 1986 and 2000 he served as a Senior Director at BNP Paribas, where he established and led Paribas Properties, Inc., a real estate investment arm of the bank, and also where he was a lead officer of the then newly created U.S. asset workout group. Mr. Wexler started his professional career in 1981 in commercial lease brokerage, asset management and investment sales at Jones Lang Wootton (now Jones Lang LaSalle) where he worked until 1986. He earned a B.A. in Political Science from Johns Hopkins University.

Mr. Wexler's qualifications to serve on our Board include his experience in investment and senior management roles, as well as his business training and education.

Nicholas J. Singer has served on our Board of Directors since June 2022. Mr. Singer has over 20 years of experience in finance and investments and is the Founder and Managing Partner of Purchase Capital. He is also the Founder & Executive Chairman of United Parks, Chairman of IntegriCo Composites, the Chairman of OWYN (Only What You Need), a Board Member of Eterna Therapeutics Inc., a Board Member of the National Medal of Honor Museum Foundation, a Trustee of the Perez Art Museum Miami, and a member of the James Madison Council at the Library of Congress.

From 2007 to 2013, Mr. Singer was the Co-Founder & Co-Managing Member of Standard General, an SEC registered investment advisor which managed over $1 billion of assets during his tenure. Prior to that, he was a Founding Partner of Cyrus Capital Partners, a Principal at Och-Ziff Capital Management, and an Analyst in High Yield Trading and in the Principal Investment Area at Goldman Sachs & Co. He graduated summa cum laude with a B.S. in Economics from the Wharton School and a B.A.S. in Electrical Engineering from the School of Engineering and Applied Science at the University of Pennsylvania.

Mr. Singer's qualifications to serve on our Board include his extensive management, investment and financial experience, his business training and education, and his background serving on boards.

Family Relationships

There are no family relationships between any of our officers or directors.

Involvement in Certain Legal Proceedings

Our directors and executive officers are not parties to any material legal proceedings other than as set forth in Part II, Item 3 above.

CORPORATE GOVERNANCE

Overall Role of the Board

Our common stock is listed on the Nasdaq Capital Market under the symbol ‘‘ERNA.’’ Pursuant to our Bylaws and the Delaware General Corporation Law, our business and affairs are managed under the direction of our Board. Directors are kept informed of the Company’s business through discussions with management, by reviewing materials provided to them and by participating in meetings of the Board and its committees.

The Board has adopted Corporate Governance Guidelines that contain general principles regarding the responsibilities and function of our Board and Board Committees, a copy of which is available at: www.eternatx.com under Investor Relations—Governance. Information contained on, or accessible through, our website does not form a part of this Annual Report on Form 10-K and is not incorporated by reference.

Board Leadership Structure

The Board believes it is appropriate to separate the roles of the Chairman of the Board and the Chief Executive Officer. The Chairman of the Board is charged with acting as a liaison between the Board and our management team, including oversight of management’s implementation of the Board’s strategies and directives. The Chief Executive Officer is responsible for providing general supervision of the affairs of the Company and general control of all of our business subject to the ultimate authority of the Board.

Mr. Cherington has served as the Chairman of the Board of Directors since March 2021, and Dr. Angel has served as the Chief Executive Officer since January 2023 and as Interim Chief Executive Officer since May 2022.

The Board believes it is appropriate at this time in our growth for Mr. Cherington to serve as Chairman because his strong management experience, knowledge of our industry, and innovative leadership skills support management’s execution of our strategy and focus our directors’ attention on the most critical matters affecting our business.

Risk Oversight. One of the key functions of our Board is informed oversight of our risk management process. Our Board administers this oversight function directly through our Board as a whole, as well as through various standing committees of our Board that address risks inherent in their respective areas of oversight. In particular, our Board is responsible for monitoring and assessing strategic risk exposure, and our Audit Committee has the responsibility to consider and discuss our major financial risk exposures and the steps our management has taken to monitor and control these exposures. The Audit Committee also has the responsibility to review with management the process by which risk assessment and management is undertaken, monitor compliance with legal and regulatory requirements, and review the adequacy and effectiveness of our internal controls over financial reporting. Our Nominating and Corporate Governance Committee is responsible for periodically evaluating our company’s corporate governance policies and systems.

Diversity and Inclusion. Although we do not have a formal diversity policy, the Nominating and Corporate Governance Committee, in accordance with its policies and procedures for director candidates, seeks to identify candidates who will enhance the Board’s overall diversity.

Board Diversity Matrix as of March 20, 2023

Total number of directors	**5**			
	Female	**Male**	**Non-Binary**	**Did Not Disclose Gender**
Part I: Gender Identity				
Directors		5	—	—
Part II: Demographic Background				
African-American or Black	—	—	—	—
Alaskan Native or Native American	—	—	—	—
Asian	—	—	—	—
Hispanic	—		—	—
Native Hawaiian or Pacific Islander	—	—	—	—
White		4	—	—
Two or more races or ethnicities	—	—	—	—
LGBTQ+	—	—	—	—
Did not disclose demographic background	—	1	—	—

Corporate Governance Guidelines. Our Board strongly supports effective corporate governance and has developed and followed a program of strong corporate governance. Our Nominating and Corporate Governance Committee is responsible for overseeing our governance guidelines and reporting and making recommendations to the Board concerning corporate governance matters. Our guidelines are published on our website at www.eternatx.com and are available in print to any stockholder who requests them from our Secretary.

Code of Ethics. Our Board has adopted a Code of Conduct and Ethics that applies to all of our employees, officers and directors, including our Chief Executive Officer, Chief Financial Officer and other executive and senior financial officers. The full text of our Code of Conduct and Ethics is available on our website at www.eternatx.com under Investor Relations—Governance and is available in print to any stockholder who requests a copy from our Secretary. We intend to disclose future amendments to certain provisions of our Code of Business Conduct and Ethics, or waivers of certain provisions as they relate to our directors and executive officers, at the same location on our website or in our public filings. The information on our website is not intended to form a part of or be incorporated by reference into this Annual Report on Form 10-K.

Board and Committee Meetings; Meeting Attendance. The Board and its Committees meet regularly during the year, and they hold special meetings and act by unanimous written consent as circumstances require. Independent directors meet at regularly scheduled executive sessions without management present. Our Board held 28 meetings in calendar year 2022. Each director attended at least 75 percent of the aggregate of the total number of Board meetings and the total number of meetings held by all committees of the Board on which he or she served.

Although we do not have a formal policy with respect to the attendance of directors at our annual stockholder meetings, we encourage all of our directors to attend our annual stockholder meetings.

Board Committees. Our Board has three standing committees: an Audit Committee; a Compensation Committee; and a Nominating and Corporate Governance Committee. Each of the committees reports to the Board as it deems appropriate and as the Board may request. The composition, duties and responsibilities of these committees are set forth below. In the future, our Board may establish other committees, as it deems appropriate, to assist it with its responsibilities.

The table below provides current committee membership information:

Name	Audit Committee	Compensation Committee	Nominating and Corporate Governance Committee
William Wexler	Chair	X	X
Nicholas J. Singer	X	Chair	X
Charles Cherington	X	X	Chair

Committee Meetings. During 2022, our Audit Committee held 11 meetings and took action by written consent two times; our Compensation Committee held six meetings and took action by written consent eight times; and our Nominating and Corporate Governance Committee held one.

Audit Committee. We have a standing audit committee established in accordance with Section 3(a)(58)(A) of the Exchange Act. Our Audit Committee is responsible for, among other things:

- appointing, compensating, retaining, evaluating, terminating and overseeing our independent registered public accounting firm;
- discussing with our independent registered public accounting firm their independence from management;
- reviewing, with our independent registered public accounting firm, the scope and results of their audit;
- approving all audit and permissible non-audit services to be performed by our independent registered public accounting firm;
- overseeing the financial reporting process and discussing with management and our independent registered public accounting firm the quarterly and annual financial statements that we file with the SEC;
- overseeing our financial and accounting controls and compliance with legal and regulatory requirements;
- reviewing our policies on risk assessment and risk management;
- reviewing related person transactions; and
- establishing procedures for the confidential anonymous submission of concerns regarding questionable accounting, internal controls or auditing matters.

Our Audit Committee consists of William Wexler (Chair), Charles Cherington and Nicholas J. Singer, all of whom meet the requirements for independence of Audit Committee members under applicable Nasdaq and SEC rules, including Rule 10A-3 promulgated under the Exchange Act. All of the members of our Audit Committee meet the requirements for financial literacy under the applicable rules and regulations of the SEC and Nasdaq. In addition, Mr. Singer qualifies as our ''Audit Committee financial expert,'' as such term is defined in Item 407 of Regulation S-K.

Our Board has adopted a written charter for the Audit Committee, which is available on our website at: www.eternatx.com under Investor Relations—Governance. The information on our website is not intended to form a part of or be incorporated by reference into this Annual Report on Form 10-K.

Compensation Committee. Our Compensation Committee is responsible for, among other things:

- reviewing and approving the corporate goals and objectives, evaluating the performance and reviewing and approving the compensation of our executive officers;
- reviewing and approving or making recommendations to our Board of Directors regarding our incentive compensation and equity-based plans, policies and programs;
- reviewing and approving all employment agreement and severance arrangements for our executive officers;
- making recommendations to our Board of Directors regarding the compensation of our directors; and
- retaining and overseeing any compensation consultants.

Our Compensation Committee consists of Nicholas J. Singer, Charles Cherington and William Wexler, with Mr. Singer serving as the chair. Each member of our Compensation Committee is independent, as defined under the Nasdaq listing rules, including Nasdaq's additional independence standards for Compensation Committee members. Each member of our Compensation Committee is a non-employee director (within the meaning of Rule 16b-3 under the Exchange Act).

The Compensation Committee may establish and delegate authority to one or more subcommittees consisting of one or more of its members, when the Compensation Committee deems it appropriate to do so in order to carry out its responsibilities. In carrying out its responsibilities, the Compensation Committee shall be entitled to rely upon the advice and information that it receives in its discussions and communications with management and such experts, advisors and professionals with whom the Compensation Committee may consult.

Our Board has adopted a written charter for the Compensation Committee, which is available on our website at: www.eternatx.com under Investor Relations—Governance. The information on our website is not intended to form a part of or be incorporated by reference into this Annual Report on Form 10-K.

Nominating and Corporate Governance Committee. Our Nominating and Corporate Governance Committee is responsible for, among other things:

- identifying individuals qualified to become members of our Board of Directors, consistent with criteria approved by our Board of Directors;
- overseeing succession planning for our executive officers;
- periodically reviewing our Board of Directors' leadership structure and recommending any proposed changes to our Board of Directors;
- overseeing periodic evaluations of the effectiveness of our Board of Directors and its committees; and
- developing and recommending to our Board of Directors a set of corporate governance guidelines.

Our Nominating and Corporate Governance Committee consists of Charles Cherington, Nicholas J. Singer and William Wexler, with Mr. Cherington serving as the chair. Each member of our Nominating and Corporate Governance Committee is independent as defined under the Nasdaq listing rules.

Our Board has adopted a written charter for the Nominating and Corporate Governance Committee, which is available on our website at: www.eternatx.com under Investor Relations—Governance. The information on our website is not intended to form a part of or be incorporated by reference into this Annual Report on Form 10-K.

Section 16(a) Beneficial Ownership Reporting Compliance

Section 16(a) of the Exchange Act requires our directors, executive officers and persons who beneficially own more than 10% of a registered class of our equity securities to file with the SEC reports of ownership of, and transactions in, our equity securities. To our knowledge, based solely on a review of copies of such reports that we received, our records and written representations received from our directors, executive officers and certain of those persons who own greater than 10% of any class of our equity securities, for the year ended December 31, 2022, all applicable Section 16(a) filing requirements were complied with on a timely basis.

ITEM 11. *Executive Compensation*

Introduction

When determining executive officer compensation, and the various components that comprise it, our Compensation Committee evaluates and considers publicly available executive officer compensation survey data to present a competitive compensation package to attract and retain top talent, including an appropriate level of salary, performance-based bonus and equity incentives. Typically, the Compensation Committee evaluates between three and five different sources of compensation data to provide relevant market benchmark data for a given executive role. Additionally, the Compensation Committee is authorized to engage outside advisors and experts to assist and advise the Compensation Committee on matters relating to executive compensation. The Compensation Committee currently retains the services of Aon's Human Capital Solutions practice, a division of Aon plc (''Aon''), an independent compensation consultant. Our Chief Executive Officer presents compensation recommendations to the Compensation Committee with respect to the executive officers other than himself. The Compensation Committee considers such recommendations, in conjunction with input from the Compensation Committee's independent compensation consultant, in making compensation decisions or recommendations to the full Board. The full board of directors participates in evaluating the performance of our executive officers, except that neither our former CEO, Howard J. Federoff, or our current CEO, Dr. Matthew Angel, participated when the Board evaluated their respective performance, and neither was present during voting or deliberations regarding their respective performance or compensation matters.

Named Executive Officers

Under applicable SEC rules and regulations, all individuals who served as our principal executive officer during 2022, our two most highly compensated executive officers (other than our principal executive officer) who were serving as executive officers at December 31, 2022, and up to two additional individuals who would have been one of our top two most highly compensated executive officer had they been serving as an executive officer at the end of 2022 are referred to as our ''named executive officers'' and identified in the table below:

Name	Title
Matthew Angel	Chief Executive Officer
Howard J. Federoff	Former Chief Executive Officer
Andrew Jackson	Chief Financial Officer
Roger Sidhu[(1)]	Chief Medical Officer
Kevin D'Amour	Former Chief Scientific Officer

(1) Dr. Sidhu resigned as our Chief Medical Officer effective January 31, 2023.

Summary Compensation Table

The following table sets out the compensation for our Named Executive Officers for the years ended December 31, 2022 and December 31, 2021:

Name and Principal Position	Fiscal Year	Salary (US$)	Bonus (US$)	Stock-Based Awards (US$)[1]	Option-Based Awards (US$)[1]	Non-Equity Incentive Plan Compensation (US$)[2]	Nonqualified deferred compensation earnings (US$)	All Other Compensation (US$)	Total Compensation (US$)
Matthew Angel, ... Chief Executive Officer and President[3]	2022	$ —	$210,959[4]	$ —	$ 910,453	$ —	$—	$ 29,842[5]	$ 1,151,254
Howard J. Federoff, ...	2022	$182,811	$ —	$ 798,557	$ 599,422	$225,000	$—	$424,231[7]	$ 2,230,021
Former Chief Executive Officer and President[6]	2021	$318,750	$ —	$ —	$23,612,647	$159,375	$—	$ —	$24,090,772
Andrew Jackson, ... Chief Financial Officer[8]	2022	$243,679	$ —	$ —	$ 305,466	$ —	$—	$ —	$ 549,145
Roger Sidhu, ...	2022	$447,200	$ —	$ 274,369	$ 205,903	$ —	$—	$ —	$ 927,472
Former Chief Medical Officer[9]	2021	$127,045	$ —	$ 803,274	$ 1,486,131	$ 48,277	$—	$ —	$ 2,464,727
Kevin D'Amour, ...	2022	$259,375	$ —	$ 267,112	$ 200,542	$ —	$—	$175,289[11]	$ 902,318
Former Chief Scientific Officer[10]	2021	$212,216	$ —	$1,500,592	$ 2,773,903	$ 84,886	$—	$ —	$ 4,571,697

1. The amounts reported in this column represents the aggregate grant date fair value of stock options granted during the applicable year. These amounts were calculated in accordance with FASB ASC Topic 718, Compensation – Stock Compensation, except that any estimate of forfeitures was disregarded. For a description of the assumptions used in computing the dollar amount recognized for financial statement reporting purposes, see Note 14, Stock-Based Compensation, in the Notes to the Consolidated Financial Statements contained in this Annual Report on Form 10-K.
2. Represents discretionary bonuses earned by the applicable named executive officer for 2021, as determined by the Compensation Committee.
3. Dr. Angel was appointed our Interim Chief Executive Officer and President on May 26, 2022 and a member of the Board effective June 6, 2022. Dr. Angel was appointed our Chief Executive Officer and President on January 1, 2023.
4. A cash signing bonus, which represents the salary Dr. Angel would have earned for the period during which he served as interim Chief Executive Officer and President, had Dr. Angel's appointment as Chief Executive Officer and President been in effect beginning May 26, 2022.
5. Represents a reimbursement of legal fees Dr. Angel incurred in connection with entering into his employment offer letter.
6. Dr. Federoff resigned as the Company's Chief Executive Officer and as a member of the Board effective on May 26, 2022.
7. Includes $384,237 of severance payments, payment of $36,780 for final accrued paid time off, $2,965 for reimbursed legal fees Dr. Federoff incurred in connection with entering into his separation agreement and $250 for cell phone reimbursement.
8. Mr. Jackson was appointed Chief Financial Officer effective May 31, 2022.
9. Dr. Sidhu resigned as Chief Medical Officer effective January 31, 2023.
10. Dr. D'Amour resigned as Chief Scientific Officer on August 26, 2022.
11. Includes $145,609 of severance payments, payment of $24,305 for final accrued paid time off, $5,000 for reimbursed legal fees Dr. D'Amour incurred in connection with entering into his separation agreement and $375 for cell phone reimbursement.

Narrative to Summary Compensation Table

The following is a discussion of each component of our executive compensation program for 2022.

Base Salary

Each of our named executive officers receives a base salary. The base salary is the fixed cash compensation component of our executive compensation program and it recognizes individual performance, time in role, scope of responsibility, leadership skills and experience. The base salary compensates an executive for performing his or her job responsibilities on a day-to-day basis. Generally, base salaries are reviewed annually company-wide and adjusted (upward or downward) when appropriate based upon individual performance, expanded duties, changes in the competitive marketplace and, with respect to upward adjustments, if we are, financially and otherwise, able to pay it. We try to offer competitive base salaries to help attract and retain executive talent.

Annual Bonus and Incentive Compensation and Benefits

In addition to base salaries, our Compensation Committee has the authority to award discretionary annual bonuses to our named executive officers based on corporate and individual performance. Incentives, as a percent of salary, increase with executive rank so that, as rank increases, a greater portion of total annual cash compensation is based on annual corporate and individual performance.

Annual incentives are awarded based on quantitative performance standards and reward performance of each named executive officer individually. The determination of a named executive officer's performance may vary from year to year depending on economic conditions and conditions in the industry in which we operate and may be based on measures such as revenue, achievement of certain research and development milestones, completion of a strategic transaction, and other metrics the directors and management believe to provide proper incentives for achieving long-term shareholder value for Eterna. The Board retains full discretion over performance evaluation and the amount of any bonuses to be paid to a named executive officer.

Equity-Based Compensation Programs

Restated Plan

At our 2021 annual meeting of stockholders, our stockholders approved a restatement of the Eterna Therapeutics Inc. Restated 2020 Stock Incentive Plan (the ''Restated Plan''). The general purpose of the Restated Plan is to provide a means whereby eligible employees, officers, employee and non-employee directors, consultants and prospective employees may develop a sense of proprietorship and personal involvement in our development and financial success, and to encourage them to devote their best efforts to us, thereby advancing our interests and the interests of stockholders. The Board believes that the granting of stock options, restricted stock, restricted stock units, performance awards, unrestricted stock awards and similar kinds of equity-based compensation promotes continuity of management and increases incentive and personal interest in our welfare by those who are primarily responsible for shaping and carrying out our long-range plans and securing growth and financial success. In general, the Restated Plan is administered by the Compensation Committee. The Compensation Committee determines the persons to whom awards issuable under the Restated Plan may be granted. The Compensation Committee may also establish rules and regulations for the administration of the Restated Plan and amendments or modifications of outstanding awards. The Compensation Committee also delegates authority to certain executive officers grant awards and execute award agreements, subject to applicable law and the Restated Plan. Each award is set forth in a separate agreement with the person receiving the award and will indicate the type, terms and conditions of the award. A brief description of the material terms of the Restated Plan and the equity awards thereunder follows.

Eligibility

Persons eligible to receive awards under the Restated Plan consist of our employees, officers, directors, consultants, independent contractors who, in the opinion of the Compensation Committee, are in a position to contribute to our success, or any other person who is determined by the Compensation Committee to be a prospective employee, officer, director, consultant, advisor or other individual service provider, any entity whose financials statements are required to be consolidated with our company, and any other entity that the Compensation Committee determines to be an affiliate of our company. As of March 20, 2022, we had nine full-time employees, including three executive officers.

Shares Subject to the Restated Plan

The aggregate number of shares of common stock initially available for issuance in connection with awards granted under the Restated Plan is equal to the sum of (a) approximately 424,000 shares and (b) an annual increase on January 1 of each year from 2022 through 2031 equal to the lesser of (i) 5% of the number of shares of common stock outstanding on the immediately preceding December 31 and (ii) such smaller number of shares of common stock as may be determined by the Board.

Incentive stock options, or ISOs, that are intended to meet the requirements of Section 422 of the Code may be granted under the Restated Plan with respect to all of the shares of common stock authorized for issuance under the Restated Plan.

If any option or stock appreciation right, or SAR, granted under the Restated Plan is terminated without having been exercised in full or if any award is forfeited, the number of shares of common stock as to which such option,

SAR or award was terminated or forfeited will be available for future grants under the Restated Plan. Awards settled in cash will not count against the number of shares available for issuance under the Restated Plan; however, if any award is cancelled forfeited or terminated in order to pay the exercise price of a stock option, purchase price or any taxes or tax withholdings on an award, such shares will not be available for future awards under the Restated Plan.

The number of shares authorized for issuance under the Restated Plan and the foregoing share limitations are subject to customary adjustments for stock splits, stock dividends or similar transactions effected after the effective time of the Restated Plan.

Terms and Conditions of Options

Options granted under the Restated Plan may be either ISOs or ''nonstatutory stock options,'' or NSOs, that do not meet the requirements of Section 422 of the Code. The Compensation Committee will determine the exercise price of options granted under the Restated Plan. The exercise price of options may not be less than the fair market value per share of common stock on the date of grant (or 110% of fair market value in the case of ISOs granted to a ten-percent stockholder).

If on the date of grant the common stock is listed on a stock exchange or is quoted on an automated quotation system, the fair market value will generally be the closing sale price on the last trading day before the date of grant. If no such prices are available, the fair market value will be determined in good faith by the Compensation Committee based on the reasonable application of a reasonable valuation method.

No option may be exercisable for more than ten years (five years in the case of an ISO granted to a ten-percent stockholder) from the date of grant. Options granted under the Restated Plan will be exercisable at such time or times as the Compensation Committee prescribes at the time of grant. No employee may receive ISOs that first become exercisable in any calendar year in an amount exceeding $100,000.

Generally, the option price may be paid (a) in cash or by certified check, bank draft or money order, (b) through delivery of shares of common stock having a fair market value equal to the purchase price, or (c) any other methods of payment that the Compensation Committee permits in its sole and absolute discretion, including a cashless exercise program.

Stock Appreciation Rights

The Compensation Committee may grant SARs under the Restated Plan. The Compensation Committee will determine the other terms applicable to SARs. The exercise price per share of a SAR will not be less than 100% of the fair market value of a share of common stock on the date of grant, as determined by the Compensation Committee. The maximum term of any SAR granted under the Restated Plan is ten years from the date of grant. Generally, each SAR will entitle a participant upon exercise to an amount equal to:

- the excess of the fair market value on the exercise date of one share of common stock over the exercise price, multiplied by
- the number of shares of common stock covered by the SAR.

Payment may be made in shares of common stock, in cash, or partly in common stock and partly in cash, all as determined by the Compensation Committee.

Restricted Stock and Restricted Stock Units

The Compensation Committee may award restricted common stock and/or restricted stock units under the Restated Plan. Restricted stock awards consist of shares of stock that are transferred to a participant subject to restrictions that may result in forfeiture if specified conditions are not satisfied. Restricted stock units confer the right to receive shares of common stock, cash, or a combination of shares and cash, at a future date upon or following the attainment of certain conditions specified by the Compensation Committee. The restrictions and conditions applicable to each award of restricted stock or restricted stock units may include performance-based conditions. Dividends with respect to restricted stock may be paid to the holder of the shares as and when dividends are paid to stockholders or at the time that the restricted stock vests, as determined by the Compensation Committee. Dividend equivalent amounts may be paid with respect to restricted stock units either when cash dividends are paid to stockholders or when the units vest. Unless the Compensation Committee determines otherwise, holders of restricted stock will have the right to vote the shares.

Performance Shares and Performance Units

The Compensation Committee may award performance shares and/or performance units under the Restated Plan. Performance shares and performance units are awards, denominated in either shares or U.S. dollars, which are earned during a specified performance period subject to the attainment of performance criteria, as established by the Compensation Committee. The Compensation Committee will determine the restrictions and conditions applicable to each award of performance shares and performance units.

Other Stock-Based and Cash-Based Awards

The Compensation Committee may award other types of equity-based or cash-based awards under the Restated Plan, including the grant or offer for sale of shares of common stock that do not have vesting requirements and the right to receive one or more cash payments subject to satisfaction of such conditions as the Compensation Committee may impose.

Transferability of an Award

No award option may be transferred other than by will or by the laws of descent and distribution, and during a recipient's lifetime an option may be exercised only by the recipient. However, the Compensation Committee may permit the holder of an option, restricted stock or other award to transfer the option, restricted stock or other award to immediate family members.

2021 Inducement Plan

On May 20, 2021, the Board also approved our 2021 Inducement Stock Incentive Plan (the ''2021 Inducement Plan''). The 2021 Inducement Plan was adopted without stockholder approval pursuant to Section 711 of the Company Guide of the NYSE American LLC, the stock exchange on which our common stock was previously listed . The 2021 Inducement Plan provides for the grant of equity-based awards, including non-qualified stock options, performance shares, performance unis, restricted stock, restricted stock units, and stock appreciation rights, and its terms are substantially similar to the Restated Plan, including with respect to treatment of equity awards in the event of a ''Change in Control'' as defined under both Restated Plan and the 2021 Inducement Plan. The awards available for grant under the 2021 Inducement Plan are available only to new employees and cannot be issued pursuant to ISOs under Section 422 of the Code.

Benefits and Perquisites

Employee Benefit Plans

Named executive officers are eligible to participate in our employee benefit plans, including our medical, disability and life insurance plans, in each case, on the same basis as all of our other employees. The employee benefit plans are designed to assist in attracting and retaining skilled employees critical to our long-term success. We also maintain a 401(k) plan for the benefit of our eligible employees, including the named executive officers, as discussed below.

401(k) Plan

We maintain a retirement savings plan, or 401(k) plan, that provides eligible U.S. employees with an opportunity to save for retirement on a tax advantaged basis. Under the 401(k) Plan, eligible employees may defer up to 90% of their compensation subject to applicable annual contribution limits imposed by the Internal Revenue Code of 1986, as amended, or the Code and limits imposed by non-discrimination testing. Our employees' pre-tax contributions are allocated to each participant's individual account and participants are immediately and fully vested in their contributions. The 401(k) plan is intended to be qualified under Section 401(a) of the Code with the 401(k) plan's related trust intended to be tax exempt under Section 501(a) of the Code. As a tax-qualified retirement plan, contributions to the 401(k) plan and earnings on those contributions are not taxable to the employees until distributed from the 401(k) plan. As of December 31, 2022, we had not contributed a match to the employees' contribution. Beginning on January 1, 2023, we began matching employees' contributions at a rate of 100% of the first 3% of the employee's contribution and 50% of the next 2% of the employee's contribution, for a maximum match of 4%.

Pension Benefits

We do not maintain any pension benefit or retirement plans other than the 401(k) Plan.

Nonqualified Deferred Compensation

We do not maintain any nonqualified deferred compensation plans.

Executive Employment Agreements and Change in Control Arrangements

The following descriptions summarize the principal terms of our employment agreements with our named executive officers as of December 31, 2022.

Matthew Angel

On May 24, 2022, the Board appointed Dr. Angel as our interim Chief Executive Officer and President, which appointment became effective on May 26, 2022. On June 6, 2023, Dr. Angel was appointed as a member of our Board. Dr. Angel did not receive a salary or other cash compensation during his tenure as interim Chief Executive Officer and President, and he does not receive compensation for services as a member of the Board.

On August 1, 2022, we granted Dr. Angel a time-based non-qualified stock option covering 124,350 shares of common stock, of which 5,181 shares vested immediately on the grant date and the remaining 119,169 shares vest in 46 substantially equal monthly installments thereafter (the ''2022 Grant'').

On December 30, 2022, we entered into an offer letter with Dr. Angel (the ''Offer Letter'') effective on January 1, 2023 with respect to terms of his employment as our Chief Executive Officer and President. The compensatory terms of the Offer Letter, including equity awards, were approved by the Compensation Committee. Dr. Angel's hiring, and his Offer Letter, were approved by the Board. We have been working together with Dr. Angel to negotiate in good faith and execute and deliver a formal, written employment agreement by March 31, 2023 containing such other terms and conditions as are mutually acceptable to Dr. Angel and us (the ''Employment Agreement'') as contemplated by the Offer Letter.

Under the terms of the Offer Letter, we will pay Dr. Angel an annual base salary of $350,000, which amount is subject to annual review by the Board or the Compensation Committee and subject to adjustment to reflect market practices among our peers in the sole discretion of the Board or the Compensation Committee.

We also paid Dr. Angel a cash signing bonus of $210,959, which represents the salary Dr. Angel would have earned for the period during which he served as interim Chief Executive Officer had the Offer Letter been in effect as of May 26, 2022.

Dr. Angel will be eligible to receive a performance bonus (the ''Performance Bonus'') equal to two percent of the gross proceeds that we actually receive pursuant to all licensing, option, collaboration, partnership, joint venture, settlement, other similar agreements that we entered into, or other actions, judgments, or orders that generate cash proceeds to us, that are originated, negotiated and/or entered into by us during Dr. Angel's employment (commencing on May 26, 2022), subject to certain conditions to be set forth in the Employment Agreement, including that Dr. Angel has not voluntarily resigned other than for good reason or has been terminated for cause.

In accordance with the terms of the Offer Letter, on January 12, 2023, we granted to Dr. Angel a time-based incentive stock option covering 132,003 shares of common stock, of which 110,043 shares vested immediately on the grant date and the remaining 21,960 shares vest in 35 substantially equal monthly installments on the first day of each month thereafter (the ''2023 Grant'').

For both the 2022 Grant and the 2023 Grant, vesting generally requires Dr. Angel's continued employment through the relevant vesting date.

If Dr. Angel's employment is terminated by us without Cause or by Dr. Angel for Good Reason (which shall have the meaning as mutually agreed in the Employment Agreement), the portion of the 2022 Grant, the 2023 Grant and any other grant subsequently issued that would have vested during the twelve months following the date of termination would immediately vest, and Dr. Angel will have twelve months following the date of termination to exercise any vested options. In addition, the Performance Bonus will remain a continuing obligation of ours to pay Dr. Angel so long as Dr. Angel has remained employed by us for two years following the applicable agreement/arrangement underlying the applicable Performance Bonus and so long as Dr. Angel does not voluntarily resign other than for Good Reason or for Cause.

Pursuant to the Offer Letter, Dr. Angel is eligible for (a) reimbursement of reasonable business expenses, (b) participation in our benefit plans and (c) paid vacation days in accordance with our policies, as in effect from time to time.

For information on related party transactions with Dr. Angel, see Item 13, *Certain Relationships and Related Transactions, and Director Independence.*

Howard J. Federoff

We entered into an executive employment agreement, dated April 1, 2021 and effective as of April 16, 2021, with Howard J. Federoff with respect to terms of his employment as our Chief Executive Officer and President. The compensatory terms of the executive employment agreement, including equity awards, were approved by the Compensation Committee, which consists of two disinterested members of the Board. Dr. Federoff's hiring, and his executive employment agreement, were approved by the Board.

The executive employment agreement provided for our at-will employment of Dr. Federoff as our Chief Executive Officer and President for a term commencing on April 16, 2021 and continuing until terminated by us or Dr. Federoff. Dr. Federoff resigned as the Company's Chief Executive, which became effective on May 26, 2022.

Under the terms of the executive employment agreement, we paid Dr. Federoff an annual base salary of $450,000, which amount was subject to annual review by the Board or the Compensation Committee and subject to adjustment to reflect market practices among our peers in the sole discretion of the Board or the Compensation Committee. Dr. Federoff was also eligible to receive an annual cash bonus award in an amount up to 50% of his base salary upon achievement of reasonable performance targets set by the Board or the Compensation Committee, each in its sole discretion. The bonus would be determined by the Board or the Compensation Committee and paid annually in March in the year following the performance year on which such bonus was based. For the year ended December 31, 2021 we paid Dr. Federoff a $159,375 cash bonus. The agreement also provided for the grant of certain equity awards and severance benefits.

Effective May 26, 2022 (the ''Separation Date''), Dr. Federoff resigned as an employee. Upon the effective date of his resignation, we entered into a Separation Agreement and General Release with Dr. Federoff (the ''Separation Agreement''), pursuant to which Dr. Federoff resigned from his positions as Chief Executive Officer and as an officer, director and employee of the Company and all subsidiaries. In consideration for Dr. Federoff's execution of the Separation Agreement and non-revocation of a waiver and release of claims relating thereto, Dr. Federoff was entitled to the following benefits under the Separation Agreement:

- a lump sum cash severance benefit in the amount of $225,000, representing Dr. Federoff's target bonus for 2022;
- payment of Dr. Federoff's annual base salary for a period of twelve (12) months after the expiration of the applicable revocation period (the ''Separation Period''), for a total gross amount equal to $450,000;
- payment of Dr. Federoff's premiums for continued health benefits provided under COBRA for the Separation Period;
- full acceleration of the vesting of all outstanding options (with the exception of the Milestone Options) that would have vested during the Separation Period, and such options, together with outstanding options that vested prior to the Separation Date, representing collectively 71,004 shares of common stock, may be exercised for a period of thirty-six (36) months after the Separation Date;
- acceleration and vesting of $25/36^{th}$ of the Milestone Options, and such accelerated options, representing collectively 20,737 shares of common stock, may be exercised for a period of thirty-six (36) months after the Separation Date; and
- a lump sum cash severance benefit in the amount of $130,347, representing the value Dr. Federoff would have received if he was entitled to receive a settlement of a pro rata portion of the Federoff PSU Grant through the expiration of the Separation Period, assuming the performance metrics were waived and assuming a per share value of $16.20.

Under the Separation Agreement, Dr. Federoff agreed to cooperate with and assist us regarding certain matters and transitioning his employment duties and responsibilities. Subject to certain exceptions and limitations, the Separation Agreement included a general release of claims by Dr. Federoff in favor of us and certain related persons

and parties, and customary confidentiality and mutual non-disparagement provisions. The Separation Agreement also included certain other customary representations, warranties and covenants of Dr. Federoff, and provided for reimbursement of certain expenses incurred by Dr Federoff. The Separation Agreement superseded all other agreements or arrangements between Dr. Federoff and us regarding the subject matter of the agreement, including those with respect to severance payments and benefits.

Andrew Jackson

We entered into an amended and restated employment agreement, dated as of May 10, 2022, with Andrew Jackson with respect to his employment as our Chief Financial Officer. The employment agreement provides for our at-will employment of Mr. Jackson as our Chief Financial Officer for a term commencing on May 31, 2022 and continuing until terminated by us or Mr. Jackson.

Under the terms of the employment agreement, we will pay Mr. Jackson an annual base salary of $415,000, which amount is subject to periodic review by the Board or the Compensation Committee.

Mr. Jackson is eligible to receive an annual cash bonus award in an amount up to 40% of his base salary upon achievement of agreed upon performance targets. The bonus will be determined by the Board or the Compensation Committee and paid annually by March 15 in the year following the performance year on which such bonus is based. For the year ended December 31, 2022, there was no bonus earned.

In accordance with the terms of the employment agreement, Mr. Jackson is entitled to receive equity awards, consisting of a time-based nonqualified stock option, which we refer to as the Jackson Option Grant, covering 33,239 shares of common stock, 25% of which will vest on the first anniversary of the employment agreement's effective date, and the remainder will vest ratably on a monthly basis over the three-year period thereafter. Vesting generally requires Mr. Jackson's continued employment through the relevant vesting date.

If Mr. Jackson's employment is terminated by us without Cause or by Mr. Jackson for Good Reason (each such capitalized term as defined in the employment agreement), we will pay Mr. Jackson all amounts accrued but unpaid as of the effective date of such termination, as well as continuation of his salary and benefits for the following nine month period (such period, the ''Severance Period''). Notwithstanding the foregoing, if a termination without Cause or for Good Reason occurs within three months before or twelve months after a Change in Control (as defined in the employment agreement), Mr. Jackson will receive the benefits described in the preceding sentence, but the Severance Period shall run for a period of twelve months, and, in addition, Mr. Jackson will receive a lump-sum payment of his target bonus and the Jackson Option Grant shall become fully vested. Any such severance benefits under the employment agreement are contingent on Mr. Jackson entering into and not revoking a general release of claims in favor of our company.

The employment agreement provides for (a) reimbursement of reasonable business expenses, (b) participation in our benefit plans and (c) paid vacation days in accordance with our policies, as in effect from time to time, and up to an additional seven floating paid vacation days a year.

The employment agreement contains customary covenants related to non-solicitation for one year following termination of employment, as well as customary covenants related to non-competition, confidentiality, inventions and intellectual property rights.

Roger Sidhu

We had entered into an employment agreement, effective as of September 20, 2021, with Roger Sidhu with respect to terms of his employment as our Chief Medical Officer. The employment agreement provided for at-will employment of Dr. Sidhu as our Chief Medical Officer for a term commencing on September 20, 2021 and continuing until terminated by us or Dr. Sidhu. Dr. Sidhu resigned as our Chief Medical Officer effective January 31, 2023.

Under the terms of the employment agreement, we paid Dr. Sidhu an annual base salary of $447,200, which amount was subject to annual review by the Board or the Compensation Committee and subject to adjustment to reflect market practices among our peers in the sole discretion of the Board or the Compensation Committee.

Dr. Sidhu was eligible to receive an annual cash bonus award in an amount up to 40% of his base salary upon achievement of reasonable performance targets set by the board or the Compensation Committee, each in its sole discretion. The bonus would be determined by the Board or the Compensation Committee and paid annually in March in the year following the performance year on which such bonus was based. For the year ended December 31, 2021 we paid Dr. Sidhu a $48,277 cash bonus.

In accordance with the terms of the employment agreement, we granted to Dr. Sidhu, effective as of September 20, 2021, a time-based nonqualified stock option, which we refer to as the Sidhu Option Grant, and a time-based restricted stock unit grant, which we refer to as the RSU Grant. The Sidhu Option Grant covered 8,065 shares of common stock, and the RSU Grant covered 4,032 shares of common stock. The Sidhu Option Grant and the RSU Grant each vested over four years, with vesting generally subject to Dr. Sidhu's continued employment through the relevant vesting date. Consistent with the employment inducement grant rules set forth in Section 711(a) of the NYSE American LLC Company Guide, the equity award to Dr. Sidhu was made as an inducement material to his entering into employment with us and was approved by the Compensation Committee without need for stockholder approval.

If Dr. Sidhu's employment was terminated by us without Cause or by Dr. Sidhu for Good Reason (each such capitalized term as defined in the employment agreement), he would be entitled to, among other things, continued base salary for nine months following the termination date and the total monthly cost of health care continuation coverage pursuant to COBRA for such period. Notwithstanding the foregoing, if a termination without Cause or for Good Reason occurs within ninety days before or twelve months after a Change in Control (as defined in the employment agreement), Dr. Sidhu would become entitled to (a) receive the continued-based salary and total monthly cost of health care continuation coverage described in the preceding sentence for a period of twelve months rather than nine months, (b) receive a lump sum payment of his target annual bonus and (c) accelerated vesting in full of the Sidhu Option Grant and the RSU Grant. Any of such severance benefits under the employment agreement are contingent on Dr. Sidhu entering into and not revoking a general release of claims in favor of our company.

The employment agreement provided for (a) reimbursement of reasonable business expenses, (b) participation in our benefit plans and (c) twenty paid vacation days per year.

The employment agreement also contained customary covenants related to non-competition and non-solicitation for one year following termination of employment, as well as customary covenants related to confidentiality, inventions and intellectual property rights.

On March 11, 2022, we issued Dr. Sidhu a performance-based restricted stock unit grant (the ''Sidhu PSU Grant''). The Sidhu PSU Grant covered 7,108 shares of common stock and were subject to the achievement of four performance goals, which were weighted equally. Once a performance goal was achieved, the tranche of shares allocated to that performance goal would be earned and would begin to vest annually over a three-year period beginning on the date the performance goal was achieved subject to Dr. Sidhu's continued employment through the relevant vesting date. If a performance goal was not achieved, then tranche of shares allocated to that performance goal would be unearned and forfeited. As of December 31, 2022, none of the performance goals were achieved, and as a result, the shares covered under the Sidhu PSU Grant were cancelled.

There was no separation agreement entered into upon Dr. Sidhu's voluntary resignation effective January 31, 2023.

Kevin D'Amour

We entered into an employment agreement, dated June 5, 2021 and effective as of June 28, 2021, with Kevin A. D'Amour with respect to terms of his employment as our Chief Scientific Officer. The employment agreement provided for our at-will employment of Dr. D'Amour as our Chief Scientific Officer for a term commencing on June 28, 2021 and continuing until terminated by us or Dr. D'Amour. Dr. D'Amour resigned as our Chief Scientific Officer effective August 26, 2022.

Under the terms of the employment agreement, we paid Dr. D'Amour an annual base salary of $415,000, which amount was subject to annual review by the Board or the Compensation Committee and subject to adjustment to reflect market practices among our peers in the sole discretion of the Board or the Compensation Committee.

Dr. D'Amour was eligible to receive an annual cash bonus award in an amount up to 40% of his base salary upon achievement of reasonable performance targets set by the Board or the Compensation Committee, each in its sole discretion. The bonus would be determined by the Board or the Compensation Committee and paid annually in March in the year following the performance year on which such bonus was based. For the year ended December 31, 2021 we paid Dr. D'Amour a $84,886 cash bonus. We additionally granted certain equity awards to Dr. D'Amour under his employment agreement.

Effective August 26, 2022, Dr. D'Amour resigned as an employee. Upon the effective date of his resignation, we entered into a Separation Agreement and General Release with Dr. D'Amour (the "D'Amour Separation Agreement"), pursuant to which Dr. D'Amour resigned from his position as Chief Scientific Officer. In consideration for Dr. D'Amour's execution of the D'Amour Separation Agreement and non-revocation of a waiver and release of claims relating thereto, Dr. D'Amour was entitled to the following benefits under the D'Amour Separation Agreement:

- payment of Dr. D'Amour's annual base salary for a period of nine (9) months after the expiration of the applicable revocation period (the "D'Amour Separation Period"), for a total gross amount equal to $311,250;
- payment of Dr. D'Amour's premiums for continued health benefits provided under COBRA for the D'Amour Separation Period; and
- the vested portions of all Dr. D'Amour's outstanding options, representing 57,296 shares of the Company's common stock, were eligible to be exercised for a period of ninety (90) days following the separation date, and all unvested options, restricted stock units and performance stock units were immediately forfeited as of the separation date.

Under the D'Amour Separation Agreement, Dr. D'Amour agreed to cooperate with and assist us regarding certain matters and transitioning his employment duties and responsibilities. Subject to certain exceptions and limitations, the D'Amour Separation Agreement included a general release of claims by Dr. D'Amour in favor of us and certain related persons and parties, and customary confidentiality and mutual non-disparagement provisions. The D'Amour Separation Agreement also included certain other customary representations, warranties and covenants of Dr. D'Amour, and provided for reimbursement of certain expenses incurred by Dr D'Amour. The D'Amour Separation Agreement superseded all other agreements or arrangements between Dr. D'Amour and us regarding the subject matter of the agreement, including those with respect to severance payments and benefits.

Outstanding Equity Awards at 2022 Fiscal Year-End

The following table summarizes the number of shares of our common stock underlying outstanding equity incentive plan awards for each named executive officer as of December 31, 2022.

	Option Awards						Stock Awards			
Name	Grant Date	Number of securities underlying unexercised options (#) exercisable	Number of securities underlying unexercised options (#) unexercisable	Equity incentive plan awards: Number of securities underlying unexercised unearned options (#)	Option exercise price ($)	Option expiration date	Number of shares or units of stock that have not vested (#)	Market value of shares of units of stock that have not vested ($)	Equity incentive plan awards: Number of unearned shares, units or other rights that have not vested (#)	Equity incentive plan awards: Market or payout value of unearned shares, units or other rights that have not vested shares ($)
Matthew Angel, Chief Executive Officer and President[2]	8/1/2022[1]	15,542	108,808	—	9.80	8/1/2032	—	—	—	—
Howard J. Federoff, Former Chief Executive Officer and President	4/16/2021[2]	68,434	—	—	158.80	5/26/2025	—	—	—	—
	4/16/2021[2]	20,737	—	—	158.80	5/26/2025	—	—	—	—
	3/11/2022[2]	8,043	—	—	38.60	5/26/2025	—	—	—	—
Andrew Jackson, Chief Financial Officer[3]	6/3/2022[3]	—	33,239	—	12.17	6/3/2032	—	—	—	—
Roger Sidhu, Chief Medical Officer	9/20/2021[3]	2,520	5,545	—	199.20	9/20/2031	—	—	—	—
	9/20/2021[4]	—	—	—	—	—	3,024	9,737	—	—
	3/11/2022[5]	1,776	5,329	—	38.60	3/11/2032	—	—	—	—
Kevin D'Amour, Chief Scientific Officer	—	—	—	—	—	—	—	—	—	—
	—	—	—	—	—	—	—	—	—	—

1. The option vests at a rate of 2/48th of the shares subject to the award on the grant date, with the remaining shares subject to the award vesting in 46 substantially equal monthly installments thereafter.
2. The options vested pursuant to Dr. Federoff's Separation Agreement.

3. The option vests at a rate of 25% of the shares subject to the award on the one-year anniversary of the grant date, with the remaining shares subject to the award vesting in 36 substantially equal monthly installments thereafter.
4. The restricted stock units vest at a rate of 25% of the shares subject to the award in four substantially equal annual installments on the anniversary of the grant date.
5. The option vests over 36 substantially equal monthly installments.

Hedging and Pledging Company Securities

Our Insider Trading Policy prohibits our directors, officers, employees, family members of such persons and entities controlled by such persons from engaging in hedging, short sales, or trading in publicly traded put or call options with respect to our securities. Additionally, such policy prohibits the same persons from purchasing our securities on margin, borrowing against any account in which our securities are held, or pledging our securities as collateral for a loan.

Compensation-Related Risk Assessment

Our Compensation Committee assesses and monitors whether any of our compensation policies and programs is reasonably likely to have a material adverse effect on our Company. The Compensation Committee and management do not believe that the Company presently maintains compensation policies or practices that are reasonably likely to have a material adverse effect on the Company's risk management or create incentives that could lead to excessive or inappropriate risk taking by employees. In reaching this conclusion, the Compensation Committee considered all components of our compensation program and assessed any associated risks. The Compensation Committee also considered the various strategies and measures employed by the company that mitigate such risk, including: (i) the overall balance achieved through our use of a mix of cash and equity, annual and long-term incentives and time-and performance-based compensation; (ii) our use of multi-year vesting periods for equity grants; and (ii) the oversight exercised by the Compensation Committee over the performance metrics and results under the Restated Plan and the 2021 Inducement Plan.

Director Compensation.

We compensate our non-employee directors for their service in such capacity with annual retainers and equity compensation as described below. Directors who are also our employees do not receive any additional compensation for their services as directors. We do not pay fees to any of our directors for meeting attendance.

Compensation Element	Amount
Annual Board Member Compensation	Paid in cash or stock options, at the Board's discretion. Cash paid in quarterly installments or upon the effective date of an earlier resignation of the non-employee director. Stock Options to vest quarterly over one year from grant date: a. Board Member: $40,000 b. Board Chair: $70,000
Committee Member Retainers	Paid in cash or stock options, at the Board's discretion. Cash paid in quarterly installments or upon the effective date of an earlier resignation of the non-employee director. Stock Options to vest quarterly over one year from grant date: c. Audit Committee: $7,500 d. Compensation Committee: $5,000 e. Nominating/Governance Committee: $4,000
Leadership Supplemental Retainer	Paid in cash or stock options, at the Board's discretion. Cash paid in quarterly installments or upon the effective date of an earlier resignation of the non-employee director. Stock Options to vest quarterly over one year from grant date: f. Audit Committee Chair: $15,000 g. Compensation Committee Chair: $10,000 h. Nominating/Governance Committee Chair: $8,000
New Director Equity Award (outside directors)	Option for 8,260 shares of Common Stock, which option shall have an exercise price equal to the fair market value per share of common stock, as determined under the 2020 Plan, and, subject to continued service on the Board, vest in an initial installment of 1/3 of the shares on the first anniversary of the grant date, with the remaining shares to vest in 24 substantially equal installments

Compensation Element	Amount
thereafter.	

The Board and the Compensation Committee designed our non-employee director compensation program to reward directors for their contributions to our success, align the director compensation program with stockholder interests, and provide competitive compensation necessary to attract and retain high quality non-employee directors. The Compensation Committee expects to review director compensation periodically to ensure that director compensation remains competitive such that we can recruit and retain qualified directors.

2022 Director Compensation

The following table provides summary information concerning compensation paid or accrued by us to or on behalf of our non-employee directors for services rendered to us during the last fiscal year.

Name	Fees Earned or Paid in Cash ($)	Stock awards ($)	Option awards ($)[1]	Non-equity incentive plan compensation ($)	Nonqualified deferred compensation earnings ($)	All other compensation ($)	Total ($)
Charles Cherington	21,661	—	134,516	—	—	—	156,177
Gregory Fiore[2]	—	—	92,178	—	—	—	92,178
Nicholas Singer[2]	—	—	110,171	—	—	—	110,171
William Wexler[2]	—	—	112,288	—	—	—	112,288
Dennis Langer[3]	10,382	—	—	—	—	—	10,382
Erich Mohr[3]	9,569	—	—	—	—	—	9,569
Erin Enright[3]	10,822	—	162,073	—	—	—	172,895
Heather Redman[3]	9,299	—	162,073	—	—	—	171,372

1. As of December 31, 2022, our non-employee directors had the following options outstanding:

Name	Options Outstanding
Charles Cherington	22,395
Gregory Fiore	13,045
Nicholas Singer	15,595
William Wexler	15,895
Dennis Langer	—
Erich Mohr	—
Erin Enright	—
Heather Redman	—

The amounts reported in this column represents the aggregate grant date fair value of stock options granted during the applicable year. These amounts were calculated in accordance with FASB ASC Topic 718, Compensation – Stock Compensation, except that any estimate of forfeitures was disregarded. For a description of the assumptions used in computing the dollar amount recognized for financial statement reporting purposes, see Note 14, Stock-Based Compensation, in the Notes to the Consolidated Financial Statements contained in this Annual Report on Form 10-K.

(2) Appointed to the Board on June 6, 2022.

(3) Resigned from the Board effective June 5, 2022

ITEM 12. ***Security Ownership of Certain Beneficial Owners and Management and Related Stockholder Matters***

STOCK OWNERSHIP

The following table sets forth information known to us regarding beneficial ownership of common stock as of March 20, 2023 by:

- each person known by us to be the beneficial owner of more than 5% of outstanding common stock;
- each of our named executive officers and directors; and
- all of our executive officers and directors as a group.

Beneficial ownership is determined according to the rules of the SEC, which generally provide that a person has beneficial ownership of a security if he, she or it possesses sole or shared voting or investment power over that security, including options and warrants that are currently exercisable or exercisable within 60 days. In computing the number of shares beneficially owned by a person or entity and the percentage ownership of that person or entity in the table below, all shares subject to options, warrants and restricted stock units held by such person or entity were deemed outstanding if such securities are currently exercisable, or exercisable or would vest based on service-based vesting conditions within 60 days of March 20, 2023, assuming that the liquidity event vesting conditions had been satisfied as of such date. These shares were not deemed outstanding, however, for the purpose of computing the percentage ownership of any other person or entity.

The beneficial ownership of our common stock is based on 5,127,070 shares of our common stock outstanding as of March 20, 2023.

Unless otherwise indicated, we believe that each person named in the table below has sole voting and investment power with respect to all shares of common stock beneficially owned by him.

Unless otherwise noted, the business address of each of these shareholders is c/o Eterna Therapeutics, Inc., 1035 Cambridge Street, Suite 18A, Cambridge, MA 02141.

Name and Address of Beneficial Owner	Common Shares Beneficially Owned	Percentage of Common Shares Beneficially Owned	Series A Convertible Preferred Stock Beneficially Owned	Percentage of Series A Convertible Preferred Stock Beneficially Owned	Percentage of Total Voting Power
Greater than 5% Stockholders:					
Charles Cherington[(1)]	574,104	11.2%	71,306	45.7%	11.2%
George Denny[(2)]	460,209	9.0%	71,306	45.7%	9.0%
John Halpern[(3)]	452,283	8.8%	—	—	8.8%
Nicholas J. Singer[(4)]	398,349	7.8%	—	—	7.8%
Factor Bioscience Inc.[(5)]	129,033	2.5%	—	—	2.5%
Named Executive Officers and Directors:					
Charles Cherington[(1)]	574,104	11.2%	71,306	45.7%	11.2%
Nicholas J. Singer[(4)]	398,349	7.8%	—	—	7.8%
Matthew Angel[(6)]	315,460	6.0%	—	—	6.0%
William Wexler[(7)]	10,538	*	—	—	*
Gregory Fiore[(7)]	8,401	*	—	—	*
Andrew Jackson	—	—	—	—	—
Howard Federoff[(7)]	97,214	1.9%	—	—	1.9%
Roger Sidhu	1,008	*	—	—	*
Kevin D'Amour	574	*	—	—	*
AlAll current directors and executive officers as a group (7 persons)[(8)]	1,309,747	24.6%	71,306	45.7%	24.6%

* Less than 1%

(1) Includes 14,668 shares of common stock subject to issuance upon exercise of options and 2,971 shares of common stock issuable upon conversion of Series A convertible preferred stock.

(2) Includes 2,971 shares of common stock issuable upon conversion of Series A convertible preferred stock. Denny Family Partners II, LLC owns 50,453 shares of common stock and the George Denny III Trust dated 6/11/1981 owns 406,785 shares of common stock. Mr. Denny disclaims beneficial ownership of the shares held by Denny Family Partners II, LLC except to the extent of his pecuniary interest therein. Mr. Denny's address is. Mr. Denny has sole voting and dispositive power over 204 shares and has shared voting and dispositive power over 460,209 shares.

(3) Shares held by the John D. Halpern Revocable Trust, of which, Mr. Halpern and Katherine H. Halpern are trustees. Mr. Halpern and Ms. Halpern share voting and dispositive powers. Mr. Halpern's address is PO Box 540 Portsmouth, New Hampshire 03802..

(4) Includes (i) 121,882 shares of common stock held by Purchase Capital LLC and (ii) 266,214 shares of common stock held by Pacific Premier Trust as Custodian for the benefit of Mr. Singer. Mr. Singer has sole voting and investment power over all 398,349 shares. Also includes 64,478 shares of common stock subject to issuance upon exercise of options.

(5) Factor Bioscience Inc. owns 129,033 shares of common stock, over which Messrs. Angel and Rohde have shared voting and investment power. Mr. Angel also has sole voting and investment power over 45,449 shares, and Mr. Rohde has sole voting and investment power over 67,885 shares. Factor Biosciences, Inc. and Messers. Angel and Rohde have entered into lock-up agreements with respect to 168,884 shares of common stock listed above. Each lock-up agreement extends for a period of three years, provided that up to 75% of the shares of common stock subject to the lock-up agreement may be released from the lock-up restrictions earlier if the price of common stock on The Nasdaq Capital Market stock exchange exceeds specified thresholds. The lock-up agreements include customary exceptions for transfers during the applicable lock-up period. Factor Bioscience, Inc.'s address is 1035 Cambridge Street, Suite 17B, Cambridge, MA 02141.

(6) Includes 129,033 shares of common stock owned by Factor Biosciences Inc., of which Dr. Angel owns approximately 64% of the outstanding equity, and 140,978 shares of common stock subject to issuance upon exercise of options.

(7) Represents shares of common stock subject to issuance upon exercise of options.

(8) Includes 187,124 shares of common stock issuable upon exercise of options and 2,971 shares of common stock issuable upon conversion of Series A convertible preferred stock.

SECURITIES AUTHORIZED FOR ISSUANCE UNDER EQUITY COMPENSATION PLANS

The following table contains information as of December 31, 2022 with respect to compensation plans under which any of our equity securities are authorized for issuance.

	Equity Compensation Plan Information		
Plan Category	**Number of securities to be issued upon exercise of outstanding options, warrants and rights**	**Weighted-average exercise price of outstanding options, warrants and rights**	**Number of securities remaining available for future issuance under equity compensation plans (excluding securities reflected in column (a))**
	(a)	**(b)**	**(c)**
Equity compensation plans approved by securityholders	258,092	$ 16.72	165,694
Equity compensation plans not approved by securityholders[(1)]	105,072	$160.83	56,774
Total	363,164	$ 57.18	222,468

(1) Our 2021 Inducement Plan was not approved by our stockholders. For additional information on the 2021 Inducement Plan, see ''Item 11. Executive Compensation—Narrative to Summary Compensation Table—Equity-Based Compensation Programs—2021 Inducement Plan'' contained in this Annual Report on Form 10-K.

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

Except as set forth below, since January 1, 2021, there has not been nor are there currently proposed any transactions or series of similar transactions to which we were or are to be a party in which the amount involved exceeds the lesser of $120,000 or one percent (1%) of the average of our total assets at year-end for the last two completed fiscal years and in which any director, executive officer, holder of more than 5% of the common stock or any member of the immediate family of any of the foregoing persons had or will have a direct or indirect material interest.

As previously reported, we paid consideration totaling approximately $124.0 million in respect of our acquisition of Novellus, Inc., which we refer to as the Novellus Acquisition, consisting of (a) $22.8 million in cash and (b) approximately 351,000 shares of our common stock, which under the terms of the agreement and plan of acquisition, dated as of July 16, 2021, by and between us, Novellus and the other parties thereto (the ''Novellus Acquisition Agreement''), were valued at a total of $102.0 million, based on a price of 290.51 per share of our common stock. In connection with the Novellus Acquisition, (i) Factor, of which Dr. Angel beneficially owns approximately 64% of its outstanding equity, received approximately $1.7 million in cash consideration from us and approximately 129,000 shares of common stock, and (ii) Dr. Angel received approximately $2.0 million in cash consideration from us and approximately 31,000 shares of common stock. In addition, Dr. Angel also received approximately 14,000 shares of common stock, which we had placed in escrow for a period that ended on July 16, 2022 to secure indemnification obligations to us under the Novellus Acquisition Agreement.

In November 2020, Novellus Limited, our wholly owned subsidiary following the Novellus Acquisition, and Factor Limited entered into the Third Amended and Restated Exclusive License Agreement (the ''Novellus-Factor License Agreement''), pursuant to which Factor Limited granted to Novellus Limited an exclusive license under certain patents owned by Factor Limited for the development of certain stem cell-based cellular therapies for treating diseases and conditions in humans and animals (the ''Factor Licensed Technology'').

In December 2020, Eterna LLC, our wholly owned subsidiary, entered into option agreements (the ''Novellus-Factor Option Agreements'') with Novellus Limited. and Factor Limited (together, the ''Licensors'') to obtain the right to exclusively license the Licensors' intellectual property and mRNA cell reprogramming and gene editing technology for use in the development of certain cell-based therapies to be evaluated and developed for treating human diseases, including certain types of cancer, sickle cell disease, and beta thalassemia (the ''Licensed Technology'').

In April 2021, Eterna LLC and the Licensors entered into an exclusive license agreement (the ''Original Factor License Agreement'') pursuant to which Eterna LLC acquired an exclusive worldwide license to the Licensed Technology for use in the development of certain mRNA, gene-editing, and cellular therapies to be evaluated and developed for treating human diseases, including certain types of cancer, sickle cell disease, and beta thalassemia.

As a result of our July 2021 Novellus Acquisition, the rights and obligations of Novellus Limited under the Novellus-Factor License Agreement pertaining to any and all licensed products from Factor Limited inured to Eterna. Our agreement with Factor Limited under the Original Factor License Agreement remained unchanged after the completion of the Novellus Acquisition.

In November 2022, following the expiration of one of the delineated milestone deadlines for certain regulatory filings required under the Novellus-Factor License Agreement expired, which permitted Factor Limited to terminate the license granted to Novellus Limited thereunder, we entered into the first amendment to the Original Factor License Agreement (the ''Amended Factor License Agreement''), pursuant to which, among other things, Factor Limited granted to Eterna LLC an exclusive, sublicensable license under certain patents owned by Factor Limited (the ''Factor Patents'') for the purpose of identifying and pursuing certain opportunities to grant to third parties sublicenses to the Factor Patents. The Amended Factor License Agreement also (i) terminated the Novellus-Factor License Agreement, (ii) confirmed Factor Limited's grant to Eterna LLC of the rights and licenses Novellus Limited previously granted to Eterna LLC under the Novellus-Factor License Agreement on the same terms and conditions as granted by Novellus Limited to Eterna LLC under such agreement, (iii) confirmed that the sublicense granted by Novellus Limited in accordance with the Novellus-Factor License Agreement to NoveCite (as discussed below), survived termination of the Novellus-Factor License Agreement; and (iv) removed Novellus Limited from the Amended Factor License Agreement and the NoveCite Agreement and replaced Novellus Limited with Factor Limited as the direct licensor to Eterna LLC and NoveCite under such agreements, respectively.

On February 20, 2023, we and Factor Limited entered into an exclusive license agreement (the ''Exclusive Factor License Agreement''), which terminated and replaced in its entirety the Amended Factor License Agreement. Subject to certain exclusive licenses or other rights granted by Factor Limited to certain third parties as of the effective date of the Amended Factor License Agreement, Factor granted us the exclusive, sublicensable license under the Factor Patents.

The term of the Exclusive Factor License Agreement expires on November 22, 2027 (the ''Expiration date'') but will be automatically extended for an additional two and a half years (such period, the ''Renewal Term'') if we receive at least $100 million in fees from sublicenses to the Factor Patents (''Sublicense Fees'') granted by it pursuant to the Exclusive Factor License Agreement. Pursuant to the Exclusive Factor License Agreement, we will pay to Factor 20% of any Sublicense Fee received by us before the Expiration Date and 30% of any Sublicense Fees received by us during the Renewal Term. We may terminate the Exclusive Factor License Agreement upon 120 days' written notice to Factor, and both parties otherwise have additional customary termination rights, including in connection with certain uncured material breaches of the Exclusive Factor License Agreement and specified bankruptcy events. Under the Exclusive Factor License Agreement, we are obligated to pay the expenses incurred by Factor Limited in preparing, filing, prosecuting and maintaining the Factor Patents and agreed to bear all costs and expenses associated with enforcing and defending the Factor Patents in any action or proceeding arising from pursuit of sublicensing opportunities under the license granted under the Exclusive Factor License Agreement.

There can be no assurance that we can successfully develop and commercialize the technology licensed under the Exclusive Factor License Agreement. See ''Risk Factors—Risks Related to our Business and Industry—We depend substantially, and expect in the future to continue to depend, on in-licensed intellectual property. Such licenses impose obligations on our business, and if we fail to comply with those obligations, we could lose license rights, which would substantially harm our business.''

Pursuant to the MSA we entered into with Factor Bioscience and the related Work Order No. 1 (the ''WO1''), Factor Bioscience is providing us with certain mRNA cell engineering research support services, including (i) access to Factor Bioscience's research laboratory facilities located in Cambridge, Massachusetts, (ii) access to Factor Bioscience's scientific equipment, (iii) training of our research staff in mRNA, iPSC, and gene editing technology, (iv) copies of protocols, formulations, and sequences useful for the development of mRNA cell engineering products and (v) in vitro transcription templates, mRNA constructs, and iPS cells useful for the development of mRNA cell engineering products. In consideration for entry into the MSA, we agreed to pay Factor Bioscience an initial fee of $5.0 million, payable in twelve equal monthly installments of approximately $0.4 million, and, following the initial

12-month period, a monthly fee of $0.4 million until such time as the WO1 is terminated. We may terminate the work under the WO1 on or after the second anniversary of the date of the MSA, subject to providing Factor Bioscience with 120 days' prior notice. Factor Bioscience may terminate such work order only on and after the fourth anniversary of the date of the MSA, subject to providing us with 120 days' prior notice.

On October 8, 2022, we entered into the Exacis Option Agreement with Exacis, pursuant to which Exacis granted us the option to negotiate and enter into an exclusive worldwide license to certain of the technology licensed by Exacis for the treatment of cancer in humans. The Exacis Option Agreement provided for us paying Exacis a fee of $250,000 for the option, which would be creditable against the fees or purchase price payable under any such license if entered into by us in accordance with Exacis Option Agreement. We did not exercise the option, and the Exacis Option Agreement terminated on December 31, 2022.

On November 23, 2022, the Company entered into the Q4-22 Purchase Agreement with the Q4-22 PIPE Investors in respect of the Q4-22 PIPE Transaction, pursuant to which the Company issued and sold to the Q4-22 PIPE Investors approximately 2,185,000 units, each unit consisting of (i) one share of common stock and (ii) two Q4-22 Warrants, each exercisable to purchase one share of common stock at an exercise price of $3.28 per share, at a purchase price of $3.53 per unit (inclusive of $0.125 per Q4-22 Warrant). The Company received aggregate gross proceeds of approximately $7.7 million, and the Q4-22 PIPE Transaction closed on December 2, 2022. Each Q4-22 Warrant becomes exercisable six months following the date of closing, expires five-and-one-half years following such date, and is subject to customary adjustments.

Mr. Charles Cherington, Chairman of the Company's Board of Directors, and Mr. Nicholas Singer, a director of the Company, participated in the Q4-22 PIPE Transaction on the same terms and subject to the same conditions as all other Q4-22 PIPE Investors.

Related Party Transaction Policy

Our Audit Committee is responsible for the review, approval, or ratification of any potential conflict of interest transaction involving any of our directors or executive officers, director nominees, any person known by us to be the beneficial owner of more than 5% of our outstanding capital stock, or any family member of or related party to such persons, including any transaction required to be reported under Item 404(a) of Regulation S-K promulgated by the SEC.

In reviewing any such proposed transaction, our Audit Committee is tasked with considering all relevant facts and circumstances, including the commercial reasonableness of the terms, the benefit or perceived benefit, or lack thereof, to us, opportunity costs of alternate transactions, the materiality and character of the related person's direct or indirect interest and the actual or apparent conflict of interest of the related person.

Under our policy, employees are required to report any material transaction or relationship that could result in a conflict of interest to our compliance officer.

Director Independence

Our Board undertook a review of the independence of each director. Based on information provided by each director concerning his or her background, employment, and affiliations, our Board has determined that the Board meets independence standards under the applicable rules and regulations of the SEC and the listing standards of Nasdaq. The Board of Directors has affirmatively determined that the following Directors are ''independent'' as defined in the listing standards of Nasdaq: Charles Cherington; Nicholas J. Singer; and William Wexler. In making these determinations, our Board considered the current and prior relationships that each non-employee director has with our Company and all other facts and circumstances our Board deemed relevant in determining their independence, including the beneficial ownership of our capital stock by each non-employee director, and the transactions involving them described in the section titled ''Certain Relationships and Related Party Transactions.''

ITEM 14. ***Principal Accounting Fees and Services***

Change in Certifying Accountant

On January 18, 2022, we notified Marcum LLP (''Marcum'') that it would be dismissed as our independent registered public accounting firm effective after the completion of Marcum's audit of our financial statements for the year ended December 31, 2021. The Audit Committee approved Marcum's dismissal on January 18, 2022.

Marcum performed audits of our consolidated financial statements for the years ended December 31, 2021 and 2020. Marcum's reports for such years did not contain an adverse opinion or a disclaimer of opinion and were not qualified or modified as to uncertainty, audit scope, or accounting principles. During the two years ended December 31, 2021, and from December 31, 2020 through January 24, 2022, there were no (i) disagreements (as defined in Item 304(a)(1)(iv) of Regulation S-K and the related instructions to Item 304 of Regulation S-K promulgated by the SEC pursuant to the Exchange Act) between us and Marcum on any matter of accounting principles or practices, financial statement disclosure, or auditing scope or procedure, which disagreements, if not resolved to satisfaction of Marcum, would have caused Marcum to make reference to the subject matter of such disagreements in connection with its report, or (ii) "reportable events," as described in Item 304(a)(1)(v) of Regulation S-K, that would require disclosure under Item 304(a)(1)(v) of Regulation S-K, except for the material weaknesses previously reported in our Quarterly Report on Form 10-Q for the period ended September 30, 2021 related to (a) segregation of duties and (b) documentation of policies and procedures critical to the accomplishment of financial reporting objectives. We previously furnished Marcum with a copy of the disclosure under this heading "Change in Certifying Accountant" prior to filing a Current Report on Form 8-K containing such disclosure with the SEC on January 24, 2022 and requested that Marcum furnish it with a letter addressed to the SEC stating whether or not it agreed with the statements made by us in such Current Report on Form 8-K insofar as they related to Marcum's audit services and engagement as our independent registered public accounting firm. A copy of Marcum's letter concurring with the foregoing disclosures was attached as Exhibit 16.1 to the Current Report on Form 8-K filed by us on January 24, 2022. Marcum's dismissal became effective on April 15, 2022, and no events had occurred since the filing of such Form 8-K that would have required the filing of an amendment to such Form 8-K.

On January 18, 2022, we notified Grant Thornton LLP ("Grant Thornton") that the Audit Committee had selected Grant Thornton to serve as our independent registered public accounting firm for the fiscal year ending December 31, 2022 and related interim periods, and Grant Thornton's engagement became effective on April 18, 2022.

During the two years ended December 31, 2021 and from December 31, 2019 through April 19, 2022 (the date on which we filed a Current Report on Form 8-K, reporting the respective effective dates of Marcum's dismissal and Grant Thornton's engagement), neither we nor anyone acting on its behalf has consulted Grant Thornton regarding either: (i) the application of accounting principles to a specified transaction, either completed or proposed; or the type of audit opinion that might be rendered on our financial statements, and no written report or oral advice was provided to us by Grant Thornton that Grant Thornton concluded was an important factor considered by us in reaching a decision as to an accounting, auditing or financial reporting issue; or (ii) any matter that was either subject of a disagreement, as that term is defined in Item 304 (a)(1)(iv) of Regulation S-K and the related instructions to Item 304 of Regulation S-K, or a "reportable event," as that term is described in Item 304(a)(1)(v) of Regulation S-K.

Fees and Services of Independent Registered Public Accounting Firm

The table below summarizes the fees and expenses billed to us by Grant Thornton and Marcum for the years ended December 31, 2022 and 2021.

Year	Audit Fees	Audit-Related Fees	Tax Fees	All Other Fees	Total
2022	$435,750	$—	$ —	$—	$435,750
2021	$357,925	$—	$18,540	$—	$376,465

Audit Fees. Audit fees consist of services rendered by an independent registered public accounting firm for the audit of our consolidated financial statements (including tax services performed to fulfill the auditor's responsibility under generally accepted auditing standards) and our internal control over financial reporting, reviews of the interim financial statements included in Forms 10-Q and includes services that generally only an external auditor can reasonably provide, such as comfort letters, statutory audits, attest services, consents and assistance with and review of documents filed with the SEC.

Audit-Related Fees. Audit-related fees consist of assurance and related services (e.g., due diligence) by an external auditor that are reasonably related to the audit or review of financial statements, including employee benefit plan audits, due diligence related to mergers and acquisitions, accounting consultations and audits in connection with proposed or consummated acquisitions, internal control reviews, attest services related to financial reporting that are not required by statute or regulation, and consultation concerning financial accounting and reporting standards.

Tax Fees. Tax fees consist of services rendered by an external auditor for tax compliance, tax consulting and tax planning.

All Other Fees. All other fees are for any other permissible work that is not an Audit, Audit-Related or Tax Fee.

Policy for Approval of Audit and Permitted Non-Audit Services

All audit and permissible non-audit services provided by the independent auditors are pre-approved by the Audit Committee (or the Chair of the Audit Committee, pursuant to a delegation of authority). These services may include audit services, audit-related services, tax services and other services. Pre-approval is generally provided for up to one year and any pre-approval is detailed as to the particular service or category of services and is generally subject to a specific budget. The independent auditors and management are required to periodically report to the Audit Committee regarding the extent of services provided by the independent auditors in accordance with this pre-approval, and the fees for the services performed to date. The Audit Committee may also pre-approve particular services on a case-by-case basis.

PART IV

ITEM 15. ***Exhibits, Financial Statement Schedules***

(a) The following documents are filed as a part of this Annual Report on Form 10-K:

(1) Consolidated Financial Statements. The consolidated financial statements of the Company and its consolidated subsidiaries are set forth in the ''Index to Consolidated Financial Statements'' on page F-1.

(2) Financial Statement Schedules. None

(3) Exhibits. The following exhibits are submitted with this Annual Report on Form 10-K or, where indicated, incorporated by reference to other filings. TBD

Exhibit	Description	Incorporated By Reference
2.1(b)	Agreement and Plan of Merger and Reorganization, dated August 12, 2020, among NTN Buzztime, Inc., BIT Merger Sub, Inc. and Eterna Therapeutics LLC	Exhibit 2.1 to the proxy statement/prospectus on Form S-4/A filed on January 20, 2021
2.2(b)	Agreement and Plan of Acquisition, dated as of July 16, 2021, by and among Eterna Therapeutics Inc., Brooklyn Acquisition Sub, Inc., Novellus LLC, Novellus, Inc., and the Sellers' Representative	Exhibit 10.1 to Form 8-K filed on July 19, 2021
3.1	Composite Restated Certificate of Incorporation of the Company	Filed herewith
3.2	Second Amended and Restated Bylaws of the Company	Exhibit 3.2 to Form 8-K filed on October 11, 2022
3.3	Certificate of Validation of Eterna Therapeutics Inc., as filed with the Secretary of State of the State of Delaware on September 3, 2021	Exhibit 3.1 to Form 8-K filed on September 13, 2021
4.1	Description of Registrant's Securities Registered Pursuant to Section 12 of the Securities Exchange Act of 1934	Exhibit 4.1 to Form 10-K filed on April 15, 2022
10.1	Securities Purchase Agreement, dated as of March 6, 2022, between Eterna Therapeutics Inc. and the purchaser party thereto	Exhibit 10.1 to Form 8-K filed on March 9, 2022
10.2	Registration Rights Agreement, dated as of March 6, 2022, between Eterna Therapeutics Inc. and the purchaser party thereto	Exhibit 10.4 to Form 8-K filed on March 9, 2022
10.3	Form of Pre-Funded Warrant	Exhibit 10.2 to Form 8-K filed on March 9, 2022
10.4	Form of Common Stock Warrant	Exhibit 10.3 to Form 8-K filed on March 9, 2022
10.5	Agreement to Assign Space Lease dated March 5, 2022 between Eterna Therapeutics LLC and Regen Lab USA LLC.	Exhibit 10.5 to Form 10-Q filed on July 1, 2022
10.6	Assignment and Assumption of Lease dated March 25, 2022 between Eterna Therapeutics LLC and Regen Lab USA LLC	Exhibit 10.6 to Form 10-Q filed on July 1, 2022
10.7(a)	Amended and Restated Executive Employment Agreement, dated as of May 10, 2022, by and between Eterna Therapeutics Inc. and Andrew Jackson	Exhibit 10.1 to Form 8-K filed on May 31, 2022
10.8(a)	Separation Agreement and General Release, dated May 25, 2022, by and between Eterna Therapeutics Inc. and Howard J. Federoff	Exhibit 10.2 to Form 8-K filed on May 31, 2022
10.9	Torrey Pines Science Center Lease, dated March 31, 2022, between Eterna Therapeutics Inc. and Torrey Pines Science Center Limited Partnership	Exhibit 10.3 to Form 10-Q filed on August 11, 2022
10.10	Exclusive License Agreement, dated as of April 26, 2021, between Factor Bioscience Limited, Novellus Therapeutics Limited and Eterna Therapeutics	Exhibit 10.3 to Form 8-K filed on April 30, 2021
10.11	First Amendment to Exclusive License Agreement, dated November 22, 2022, by and among Eterna Therapeutics Inc., Eterna Therapeutics LLC, Novellus Therapeutics Limited and Factor Bioscience Limited	Exhibit 10.1 to Form 8-K filed on November 22, 2022

Exhibit	Description	Incorporated By Reference
10.12	Exclusive License Agreement, dated February 20, 2023, by and between Factor Bioscience Limited and Eterna Therapeutics Inc.	Exhibit 10.1 to Form 8-K filed on February 22, 2023
10.13	Third Amended and Restated Exclusive License Agreement, dated November 1, 2020, by and between Factor Bioscience Limited and Novellus Therapeutics Limited	Exhibit 10.3 to Form 10-Q filed on November 14, 2022
10.14	Master Services Agreement, dated September 9, 2022, by and between Factor Bioscience Inc. and Eterna Therapeutics Inc.	Exhibit 10.1 to Form 8-K filed on September 15, 2022
10.15(a)	Separation Agreement and General Release, dated August 24, 2022, by and between Eterna Therapeutics Inc and Kevin D'Amour	Exhibit 10.1 to Form 8-K/A filed on September 1, 2022
10.16	Sublease Agreement, dated October 18, 2022, by and between E.R. Squibb & Sons, LLC and Eterna Therapeutics Inc.	Filed herewith
10.17	Option Agreement, dated October 8, 2022, by and between Exacis Biotherapeutics, Inc. and Eterna Therapeutics Inc.	Exhibit 10.1 to Form 8-K filed on October 14, 2022
10.18	Securities Purchase Agreement, dated as of November 23, 2022, by and among Eterna Therapeutics Inc. and the purchasers party thereto	Exhibit 10.1 to Form 8-K filed on November 25, 2022
10.19	Form of Warrant	Exhibit 10.1 to Form 8-K filed on December 5, 2022
10.20	Registration Rights Agreement, dated as of December 2, 2022, by and among Eterna Therapeutics Inc. and the purchasers party thereto	Exhibit 10.2 to Form 8-K filed on December 5, 2022
10.21	Lease Termination Agreement, dated November 30, 2022, by and between Torrey Pines Science Center Limited Partnership and Eterna Therapeutics Inc.	Filed herewith
10.22	First Amendment to Lease Termination Agreement, dated December 29, 2022, by and between Torrey Pines Science Center Limited Partnership and Eterna Therapeutics Inc.	Filed herewith
10.23	Angel Offer Letter, dated December 30, 2022, by and among Eterna Therapeutics Inc. and Dr. Matthew Angel	Exhibit 10.1 to Form 8-K filed on January 4, 2023
10.24	Registration Rights Agreement, dated as of April 26, 2021, between Eterna Therapeutics Inc. and Lincoln Park Capital Fund, LLC	Exhibit 10.2 to Form 8-K filed on April 30, 2021
10.25	Registration Rights Agreement, dated as of May 26, 2021, between Eterna Therapeutics Inc. and Lincoln Park Capital Fund, LLC	Exhibit 10.2 to Form 8-K filed on May 26, 2021
10.26	Registration Rights Agreement, dated as of July 16, 2021, by and among Eterna Therapeutics Inc. and the individuals and entities named therein.	Exhibit 10.2 to Form 8-K filed on July 19, 2021
10.27	Purchase Agreement, dated as of April 26, 2021, between Eterna Therapeutics Inc. and Lincoln Park Capital Fund, LLC	Exhibit 10.1 to Form 8-K filed on April 30, 2021
10.28	Purchase Agreement, dated as of May 26, 2021, between Eterna Therapeutics Inc. and Lincoln Park Capital Fund, LLC	Exhibit 10.1 to Form 8-K filed on May 26, 2021
10.29(a)	Eterna Therapeutics Inc. 2021 Inducement Stock Incentive Plan	Exhibit 10.3 to Form 8-K filed on May 26, 2021
10.29(a)	Eterna Therapeutics Inc. Restated 2020 Stock Incentive Plan	Exhibit 99.1 to Form 8-K filed on September 13, 2021
16.1	Marcum, LLP letter dated January 24, 2022	Exhibit 16.1 to Form 8-K filed on January 24, 2022
16.2	Marcum, LLP letter dated April 19, 2022	Exhibit 16.1 to Form 8-K filed on April 19, 2022
21.1	Subsidiaries of the Company	Filed herewith

Exhibit	Description	Incorporated By Reference
23.1	Consent of the Independent Registered Accounting Firm, Grant Thornton LLP	Filed herewith
23.2	Consent of the Independent Registered Accounting Firm, Marcum LLP.	Filed herewith
31.1	Certification of Principal Executive Officer pursuant to Section 302 of the Sarbanes-Oxley Act of 2002	Filed herewith
31.2	Certification of Principal Financial Officer pursuant to Section 302 of the Sarbanes-Oxley Act of 2002	Filed herewith
32.1	Certification of Principal Executive Officer pursuant to Section 906 of the Sarbanes-Oxley Act of 2002	Furnished herewith
32.2	Certification of Principal Financial Officer pursuant to Section 906 of the Sarbanes-Oxley Act of 2002	Furnished herewith
101.INS	Inline XBRL Instance Document (the instance document does not appear in the Interactive Data File because its XBRL tags are embedded within the Inline XBRL document)	Filed herewith
101.SCH	Inline XBRL Taxonomy Extension Schema Document	Filed herewith
101.CAL	Inline XBRL Taxonomy Extension Calculation Linkbase Document	Filed herewith
101.DEF	Inline XBRL Taxonomy Extension Definition Linkbase Document	Filed herewith
101.LAB	Inline XBRL Taxonomy Extension Label Linkbase Document	Filed herewith
101.PRE	Inline XBRL Taxonomy Extension Presentation Linkbase Document	Filed herewith
104	Cover Page Interactive Data File (formatted as inline XBRL and contained in Exhibit 101)	

(a) Indicates management contract or compensatory plan.

ITEM 16. ***Form 10-K Summary***

None.

SIGNATURES

Pursuant to the requirements of Section 13 or 15(d) of the Securities Exchange Act of 1934, as amended, the registrant has duly caused this report to be signed on its behalf by the undersigned, thereunto duly authorized.

ETERNA THERAPEUTICS INC.

Date: March 20, 2023

By: */s/ Andrew Jackson*

Andrew Jackson
Chief Financial Officer
(Principal Financial Officer)

Pursuant to the requirements of the Securities Exchange Act of 1934, as amended, this report has been signed below by the following persons on behalf of the Registrant in the capacities and on the dates indicated.

Name	Title	Date
/s/ Matthew Angel **Matthew Angel**	Chief Executive Officer, President and Director (Principal Executive Officer)	March 20, 2023
/s/ Andrew Jackson **Andrew Jackson**	Chief Financial Officer (Principal Financial Officer)	March 20, 2022
/s/ Sandra Gurrola **Sandra Gurrola**	Vice President of Finance (Principal Accounting Officer)	March 20, 2022
/s/ Charles Cherington **Charles Cherington**	Chairman of the Board	March 20, 2022
/s/ Gregory Fiore **Gregory Fiore**	Director	March 20, 2022
/s/ Nicholas Singer **Nicholas Singer**	Director	March 20, 2022
/s/ William Wexler **William Wexler**	Director	March 20, 2022

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ETERNA THERAPEUTICS INC. AND SUBSIDIARIES
INDEX TO CONSOLIDATED FINANCIAL STATEMENTS

REPORT OF INDEPENDENT REGISTERED PUBLIC ACCOUNTING FIRM

Board of Directors and Stockholders
Eterna Therapeutics, Inc.

Opinion on the financial statements

We have audited the accompanying consolidated balance sheet of Eterna Therapeutics, Inc. (a Delaware corporation) and subsidiaries (the ''Company'') as of December 31, 2022, the related consolidated statements of operations, changes in members'/stockholders' equity, and cash flows for the year then ended, and the related notes (collectively referred to as the ''financial statements''). In our opinion, the financial statements present fairly, in all material respects, the financial position of the Company as of December 31, 2022, and the results of its operations and its cash flows for the year then ended, in conformity with accounting principles generally accepted in the United States of America.

Going concern

The accompanying financial statements have been prepared assuming that the Company will continue as a going concern. As discussed in Note 2 to the financial statements, the Company incurred a net loss of $24,579,000 during the year ended December 31, 2022. This condition, along with other matters as set forth in Note 2, raise substantial doubt about the Company's ability to continue as a going concern. Management's plans in regard to these matters are also described in Note 2. The financial statements do not include any adjustments that might result from the outcome of this uncertainty.

Basis for opinion

These financial statements are the responsibility of the Company's management. Our responsibility is to express an opinion on the Company's financial statements based on our audit. 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 audit in accordance with the standards of the PCAOB. Those standards require that we plan and perform the audit to obtain reasonable assurance about whether the financial statements are free of material misstatement, whether due to error or fraud. The Company is not required to have, nor were we engaged to perform, an audit of its internal control over financial reporting. As part of our audit, 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 audit included performing procedures to assess the risks of material misstatement of the financial statements, whether due to error or fraud, and performing procedures that respond to those risks. Such procedures included examining, on a test basis, evidence regarding the amounts and disclosures in the financial statements. Our audit also included evaluating the accounting principles used and significant estimates made by management, as well as evaluating the overall presentation of the financial statements. We believe that our audit provides a reasonable basis for our opinion.

Critical Audit Matters

Critical audit matters are matters arising from the current period audit of the financial statements that were communicated or required to be communicated to the audit committee and that: (1) relate to accounts or disclosures that are material to the financial statements and (2) involved our especially challenging, subjective, or complex judgments. We determined that there are no critical audit matters.

/s/ GRANT THORNTON LLP

We have served as the Company's auditor since 2022.

New York, New York
March 20, 2023

REPORT OF INDEPENDENT REGISTERED PUBLIC ACCOUNTING FIRM

To the Stockholders, Members and Board of Directors of
Eterna Therapeutics Inc. (formerly known as Brooklyn ImmunoTherapeutics, Inc.)

Opinion on the Financial Statements

We have audited the accompanying consolidated balance sheet of Eterna Therapeutics Inc. (formerly known as Brooklyn ImmunoTherapeutics, Inc.) (the ''Company'') as of December 31, 2021, the related consolidated statements of operations, stockholders' and members' equity and cash flows for the year ended December 31, 2021, and the related notes (collectively referred to as the ''financial statements''). In our opinion, the financial statements present fairly, in all material respects, the financial position of the Company as of December 31, 2021, and the results of its operations and its cash flows for the year ended December 31, 2021, in conformity with accounting principles generally accepted in the United States of America.

Explanatory Paragraph – Going Concern

The accompanying consolidated financial statements have been prepared assuming that the Company will continue as a going concern. As more fully described in Note 2, the Company has has incurred significant losses and needs to raise additional funds to meet its obligations and sustain its operations. These conditions raise substantial doubt about the Company's ability to continue as a going concern. Management's plans in regard to these matters are also described in Note 2. The consolidated financial statements do not include any adjustments that might result from the outcome of this uncertainty.

Restatement of Previously Issued Financial Statements

As disclosed in Note 3 to the 2021 consolidated financial statements, the Company has restated its financial statements for the year ended December 31, 2021 to correct an error.

Basis for Opinion

These financial statements are the responsibility of the Company's management. Our responsibility is to express an opinion on the Company's financial statements based on our audit. 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 audit in accordance with the standards of the PCAOB. Those standards require that we plan and perform the audit to obtain reasonable assurance about whether the financial statements are free of material misstatement, whether due to error or fraud. The Company is not required to have, nor were we engaged to perform, an audit of its internal control over financial reporting. As part of our audit 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 audit included performing procedures to assess the risks of material misstatement of the financial statements, whether due to error or fraud, and performing procedures that respond to those risks. Such procedures included examining, on a test basis, evidence regarding the amounts and disclosures in the financial statements. Our audit also included evaluating the accounting principles used and significant estimates made by management, as well as evaluating the overall presentation of the financial statements. We believe that our audit provides a reasonable basis for our opinion.

Critical Audit Matters

Critical audit matters are matters arising from the current period audit of the financial statements that were communicated or required to be communicated to the audit committee and that: (1) relate to accounts or disclosures that are material to the financial statements and (2) involved especially challenging, subjective, or complex judgments. We determined that there are no critical audit matters.

/s/ Marcum LLP

Marcum LLP

We are uncertain as to the year we began serving consecutively as the auditor of the Company's financial statements; however, we are aware that we were the Company's auditor consecutively since at least 2013 through 2022.

New York, NY
April 15, 2022, except for Note 3, Restatement of Previously Reported Information and Note 15, Income Taxes, as to which the date is June 30, 2022

ETERNA THERAPEUTICS INC.
CONSOLIDATED BALANCE SHEETS
(In thousands, except par value amounts)

	December 31, 2022	December 31, 2021
ASSETS		
Current assets:		
Cash	$ 11,446	$ 16,985
Other receivable	951	684
Prepaid expenses and other current assets	1,284	1,097
Total current assets	13,681	18,766
Restricted cash	4,095	—
Property and equipment, net	236	670
Right-of-use assets - operating leases	1,030	2,567
Goodwill	2,044	2,044
In-process research and development	—	5,990
Investment in non-controlling interest	59	1,000
Other assets	1,134	488
Total assets	$ 22,279	$ 31,525
LIABILITIES AND STOCKHOLDERS' EQUITY		
Current liabilities:		
Accounts payable	$ 1,620	$ 1,755
Accrued expenses	3,626	1,249
Due to related party, current	1,750	—
Operating lease liabilities, current	295	426
Other current liabilities	363	247
Total current liabilities	7,654	3,677
Due to related party, non-current	1,206	—
Warrant liabilities	331	—
Operating lease liabilities, non-current	887	2,297
Other liabilities	94	48
Total liabilities	10,172	6,022
Commitments and contingencies (Note 12)		
Stockholders' equity:		
Preferred stock, $0.005 par value, 1,000 shares authorized, 156 designated and outstanding of Series A convertible preferred stock at December 31, 2022 and 2021, $156 liquidation preference	1	1
Common stock, $0.005 par value, 100,000 shares authorized at December 31, 2022 and 2021; 5,127 and 2,601 issued and outstanding at December 31, 2022 and 2021, respectively	26	13
Additional paid-in capital	177,377	166,191
Accumulated deficit	(165,297)	(140,702)
Total stockholders' equity	12,107	25,503
Total liabilities and stockholders' equity	$ 22,279	$ 31,525

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

ETERNA THERAPEUTICS INC.
CONSOLIDATED STATEMENTS OF OPERATIONS
(In thousands, except per share amounts)

	Year ended December 31,	
	2022	**2021**
Operating expenses:		
Research and development	$ 10,392	$ 12,705
Impairment of in-process research and development	5,990	—
In-process research and development	—	80,538
General and administrative	16,835	14,724
Transaction costs	—	5,765
Total operating expenses	33,217	113,732
Loss from operations	(33,217)	(113,732)
Other income (expenses):		
Loss on sale of NTN assets	—	(9,648)
Change in fair value of warrant liabilities	10,795	—
Loss on non-controlling investment	(941)	—
Other (expense) income, net	(1,171)	899
Total other income (expenses), net	8,683	(8,749)
Loss before income taxes	(24,534)	(122,481)
Provision for income taxes	(45)	(64)
Net loss	(24,579)	(122,545)
Series A preferred stock dividend	(16)	(16)
Net loss attributable to common stockholders	$(24,595)	$(122,561)
Net loss per common share - basic and diluted	$ (8.06)	$ (56.61)
Weighted average shares outstanding - basic and diluted	3,051	2,165

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

ETERNA THERAPEUTICS INC.
CONSOLIDATED STATEMENTS OF MEMBERS'/STOCKHOLDERS' EQUITY
For the years ended December 31, 2022 and 2021
(In thousands)

	Membership Equity				Common Stock		Series A Preferred Stock		Additional Paid-in	Accumulated	
	Class A	Class B	Class C	Common	Shares	Amount	Shares	Amount	Capital	Deficit	Total
Balances at January 1, 2021	$ 23,202	$ 1,400	$ 1,000	$ 198	—	$—	—	$—	$ —	$ (18,141)	$ 7,659
Brooklyn rights offerings membership units	10,500	—	—	—	—	—	—	—	—	—	10,500
Elimination of Eterna LLC's historical members' equity	(33,702)	(1,400)	(1,000)	(198)	—	—	—	—	36,300	—	—
Common stock to be retained by NTN stockholders	—	—	—	—	76	—	—	—	8,178	—	8,178
Issuance of Series A preferred stock retained by NTN stockholders	—	—	—	—	—	—	156	1	(1)	—	—
Issuance of common stock to Eterna LLC members	—	—	—	—	1,946	10	—	—	(10)	—	—
Issuance of common stock to Financial Advisor upon consummation of merger	—	—	—	—	53	—	—	—	5,765	—	5,765
Issuance of common stock from the exercise of stock options	—	—	—	—	—	—	—	—	10	—	10
Issuance of common stock related to stock purchase agreement with Lincoln Park Capital Fund, LLC, net	—	—	—	—	178	1	—	—	52,024	—	52,025
Issuance of common stock in connection with the acquisition of Novellus, Inc.	—	—	—	—	351	2	—	—	58,682	—	58,684
Cash dividends to Series A preferred stockholders	—	—	—	—	—	—	—	—	—	(8)	(8)
Issuance of common stock in lieu of cash dividend to Series A preferred stockholders	—	—	—	—	—	—	—	—	8	(8)	—
Forfeiture of unvested restricted stock	—	—	—	—	(3)	—	—	—	—	—	—
Stock based compensation	—	—	—	—	—	—	—	—	5,235	—	5,235
Net loss	—	—	—	—	—	—	—	—	—	(122,545)	(122,545)
Balances at December 31, 2021	—	—	—	—	2,601	13	156	1	166,191	(140,702)	25,503
Issuance of common stock and pre-funded warrants in connection with March 2022 private offering, net.	—	—	—	—	275	1	—	—	(1)	—	—
Issuance of common stock from exercise of pre-funded warrants	—	—	—	—	68	—	—	—	874	—	874
Issuance of common stock and warrants in connection with November 2022 private offering, net.	—	—	—	—	2,185	12	—	—	7,383	—	7,395
Forfeiture of unvested restricted stock	—	—	—	—	(4)	—	—	—	—	—	—
Issuance of common stock from vested restricted stock units	—	—	—	—	2	—	—	—	(5)	—	(5)
Cash dividends to Series A preferred stockholders	—	—	—	—	—	—	—	—	—	(16)	(16)
Stock based compensation	—	—	—	—	—	—	—	—	2,935	—	2,935
Net loss	—	—	—	—	—	—	—	—	—	(24,579)	(24,579)
Balances at December 31, 2022	$ —	$ —	$ —	$ —	5,127	$26	156	$ 1	$177,377	$(165,297)	$ 12,107

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

ETERNA THERAPEUTICS INC.
CONSOLIDATED STATEMENTS OF CASH FLOWS
(In thousands)

	For years ended December 31,	
	2022	2021
Cash flows from operating activities:		
Net loss	$(24,579)	$(122,545)
Adjustments to reconcile net loss to net cash used in operating activities:		
Depreciation and amortization	161	117
Stock-based compensation	2,935	5,235
Amortization of right-to-use asset	336	342
Impairment of right-of-use asset	772	—
Gain on remeasurement of operating lease liability and right-of-use-asset	(642)	—
Impairment of in-process research and development	5,990	—
In-process research and development	—	80,538
Loss on disposal of fixed assets	280	13
Gain on lease termination	(85)	—
Gain on warrant liabilities	(10,795)	—
Loss on non-controlling investment	941	—
Transaction costs - shares to Financial Advisor	—	5,765
Loss on sale of NTN assets	—	9,648
Gain on forgiveness of PPP loan	—	(310)
Changes in operating assets and liabilities:		
Other receivables	(262)	(659)
Prepaid expenses and other current assets	(187)	(850)
Other non-current assets	(646)	—
Accounts payable and accrued expenses	2,034	(485)
Due to related party	2,956	—
Operating lease liability	(340)	(322)
Other liabilities	155	25
Net cash used in operating activities	(20,976)	(23,488)
Cash flows from investing activities:		
Purchase of property and equipment	(297)	(154)
Proceeds from the sale of fixed assets	250	—
Purchase of NTN, net of cash acquired	—	147
Purchase of Novellus, net of common stock issued and cash acquired	—	(22,854)
Proceeds from the sale of NTN assets, net of cash disposed	—	119
Net cash used in investing activities	(47)	(22,742)
Cash flows from financing activities:		
Proceeds from issuance of common stock and warrants in connection with private offerings	19,706	—
Expenses paid in connection with private offering	(110)	—
Issuance of common stock from exercise of pre-funded warrants	7	—
Payroll tax remitted on net share settlement of equity awards	(5)	—
Principal payments on finance leases	(2)	—
Dividends paid to Series A preferred shareholders	(16)	(8)
Cash paid for fractional shares in connection with reverse stock split	(1)	—
Net proceeds of common stock issued to Lincoln Park	—	52,025
Proceeds from sale of members' equity	—	10,500
Proceeds from the exercise of stock options	—	10
Repayment of NTN's PPP loan	—	(532)
Principal payments on notes payable	—	(410)
Net cash provided by financing activities	19,579	61,585
Net (decrease) increase in cash, cash equivalents and restricted cash	(1,444)	15,355
Cash, cash equivalents and restricted cash at beginning of period	16,985	1,630
Cash, cash equivalents and restricted cash at end of period	$ 15,541	$ 16,985

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

	For years ended December 31,	
	2022	2021
Supplemental disclosures of cash flow information:		
Cash paid during the period for:		
Interest	$ 30	$ 225
Income taxes	$ 15	$ 1
Supplemental disclosure of non-cash investing and financing activities:		
Conversion of warrant liability to equity	$ 867	$ —
Initial measurement of ROU assets and operating lease liabilities	$ 1,706	$ 866
Unpaid fees incurred in connction with private offering	$ 208	$ —
Initial measurement of finance lease liability	$ 10	$ —
Issuance of common stock for Series A preferred stock dividend	$ —	$ 8
Issuance of common stock for business combination	$ —	$ 8,178
Issuance of common Stock for Novellus acquisition	$ —	$58,684
Preferred shares issued in connection with reverse merger	$ —	$ 1
Reconciliation of cash, cash equivalents and restricted cash at end of period:		
Cash and cash equivalents	$11,446	$16,985
Restricted Cash	4,095	—
Total Cash, cash equivalents and restriced cash at end of period	$15,541	$16,985

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

1) Organization and Description of Business Operations

On October 11, 2022, Eterna Therapeutics Inc., a Delaware corporation, (''Eterna'' or the ''Company''), changed its name from Brooklyn ImmunoTherapeutics, Inc. to Eterna Therapeutics Inc. upon its filing with the Secretary of State of the State of Delaware a Certificate of Amendment to its Restated Certificate of Incorporation, as amended (the ''Charter'').

Eterna, together with its subsidiaries including Eterna Therapeutics LLC (formerly Brooklyn Immunotherapeutics LLC) (''Eterna LLC''), Novellus, Inc. (''Novellus'') and Novellus Therapeutics Limited (''Novellus Limited''), is a preclinical-stage biopharmaceutical company committed to realizing the potential of mRNA cell engineering to provide patients with transformational new medicines. Eterna has in -licensed a portfolio of over 100 patents covering key mRNA cell engineering technologies, including technologies for mRNA cell reprogramming, mRNA gene editing, the NoveSlice™ and UltraSlice™ gene-editing proteins, and the ToRNAdo™ mRNA delivery system. Eterna plans to develop and advance a pipeline of therapeutic products both internally and through strategic partnerships, with the near-term focus on strategic partnerships. Eterna licenses its mRNA technology platform from Factor Bioscience Limited (''Factor Limited'') under an exclusive license agreement. As used herein, the ''Company'' refers collectively to Eterna and its subsidiaries.

On August 12, 2020, Eterna (then known as ''NTN Buzztime, Inc.''), Eterna LLC (then known as ''Brooklyn Immunotherapeutics LLC'') and BIT Merger Sub, Inc., a wholly owned subsidiary of Eterna (the ''Merger Sub''), entered into an agreement and plan of merger and reorganization (the ''Merger Agreement'') pursuant to which, among other matters, Merger Sub merged with and into Eterna LLC, with Eterna LLC surviving the merger as a wholly owned subsidiary of Eterna (the ''Merger''). The Merger closed on March 25, 2021. The Merger was accounted for as a reverse acquisition, in which Eterna LLC was deemed the acquiring company for accounting purposes.

On March 26, 2021, Eterna sold its rights, title and interest in and to the assets relating to the pre-Merger business operated under the name ''NTN Buzztime, Inc.'' (the ''Disposition'') to eGames.com Holdings LLC (''eGames.com'') in accordance with the terms of an asset purchase agreement dated September 18, 2020, as amended, between Eterna and eGames.com (the ''Asset Purchase Agreement'').

On July 16, 2021, Eterna and its newly formed, wholly owned subsidiary Brooklyn Acquisition Sub, Inc. entered into an agreement and plan of acquisition (the ''Novellus Acquisition Agreement'') with Novellus LLC, Novellus (the sole equity holder of Novellus Limited and, prior to the closing under the Novellus Acquisition Agreement, a subsidiary of Novellus LLC), and (c) a seller representative, pursuant to which Eterna acquired Novellus and its subsidiary, Novellus Limited (the ''Novellus Acquisition''). As part of the Novellus Acquisition, Eterna also acquired 25.0% of the total outstanding equity interests of NoveCite, Inc. (''NoveCite''), a corporation focused on developing an allogeneic mesenchymal stem cell product for patients with acute respiratory distress syndrome, including from COVID-19.

2) Liquidity and Capital Resources

The Company has incurred significant operating losses and has an accumulated deficit as a result of its efforts to develop product candidates, including conducting clinical trials and providing general and administrative support for operations. As of December 31, 2022, the Company had an unrestricted cash balance of approximately $11.4 million and an accumulated deficit of approximately $165.3 million. For the year ended December 31, 2022, the Company incurred a net loss of $24.6 million, and the Company used cash in operating activities of $21.0 million.

On March 6, 2022, the Company entered into a securities purchase agreement (the ''Q1-22 Purchase Agreement'') with an investor (the ''Q1-22 PIPE Investor''), providing for the private placement (the ''Q1-22 PIPE Transaction'') to the Q1-22 PIPE Investor of approximately 343,000 units, each unit consisting of (i) one share of our common stock, par value $0.005 per share (or, in lieu thereof, one pre-funded warrant (each, a ''Q1-22 Pre-Funded Warrant'') to purchase one share of common stock) and (ii) one warrant (each, a ''Q1-22 Common Warrant'') to purchase one share of common stock, for an aggregate gross purchase price of approximately $12.0 million. The Q1-22 PIPE Transaction closed on March 9, 2022.

On October 18, 2022, the Company entered into a facility sublease agreement (the ''Sublease'') for approximately 45,500 square feet of office and laboratory space in Somerville, Massachusetts. Pursuant to the Sublease, the Company delivered to the sublessor a security deposit in the form of a letter of credit in the amount of $4.1 million, which will be reduced on an incremental basis throughout the term of the lease. The letter of credit was issued by the Company's commercial bank, which required that the Company cash collateralize the letter of credit by depositing $4.1 million in a restricted cash account with such bank. The amount of required restricted cash collateral will decline in parallel with the reduction in the amount of the letter of credit over the term of the Sublease; and the amount of restricted cash reduces by an equal amount the Company's available working capital.

On November 23, 2022, the Company entered into a securities purchase agreement (the ''Q4-22 Purchase Agreement'') with certain investors (the ''Q4-22 PIPE Investors''), providing for the private placement (the ''Q4-22 PIPE Transaction'') to the Q4-22 PIPE Investors of approximately of 2,185,000 units, each unit consisting of (i) one share of common stock and (ii) two warrants, each exercisable to purchase one share of common stock at an exercise price of $3.28 per share (the ''Q4-22 Warrants''), at a purchase price of $3.53 per unit (inclusive of $0.125 per Q4-22 Warrant). The Company received aggregate gross proceeds of approximately $7.7 million, and the Q4-22 PIPE Transaction closed on December 2, 2022. Each Q4-22 Warrant becomes exercisable six months following the date of closing, expires five-and-one-half years following such date, and is subject to customary adjustments.

In connection with preparing the accompanying consolidated financial statements as of and for the year ended December 31, 2022, the Company's management concluded that there is substantial doubt regarding the Company's ability to continue as a going concern because it does not expect to have sufficient cash or working capital resources to fund operations for the twelve-month period subsequent to the issuance date of these financial statements. The Company will need to raise additional capital, which could be through public or private equity offerings, debt financings, strategic partnerships or other means. The Company currently has no arrangements for such capital, and no assurances can be given that it will be able to raise such capital when needed, on acceptable terms, or at all.

The accompanying consolidated financial statements have been prepared on a going-concern basis, which contemplates the realization of assets and the satisfaction of liabilities in the normal course of business. The accompanying consolidated financial statements do not include any adjustments to reflect the possible future effects on the recoverability and classification of assets or the amounts and classifications of liabilities that may result from uncertainty related to the Company's ability to continue as a going concern.

3) Basis of Accounting Presentation and Summary of Significant Accounting Policies

Basis of Accounting Presentation

The consolidated financial statements have been prepared in conformity with U.S. generally accepted accounting principles (''GAAP''). Any reference in these notes to applicable guidance is meant to refer to GAAP as found in the Accounting Standards Codification (''ASC'') and Accounting Standards Updates (''ASU'') of the Financial Accounting Standards Board (''FASB''). All significant intercompany balances and transactions have been eliminated in consolidation.

As described above, the Merger closed on March 25, 2021. The Merger was accounted for as a reverse acquisition, in which Eterna LLC was deemed the acquiring company for accounting purposes. Eterna LLC's historical financial statements replaced Eterna's historical financial statements with respect to periods prior to the completion of the Merger (when Eterna operated under the name ''NTN Buzztime, Inc.''). The Company retrospectively adjusted the weighted average shares used in determining loss per common share to reflect the conversion of the outstanding Class A units, Class B units, Class C units, and common units of Eterna LLC that converted into shares of Eterna's common stock upon consummation of the Merger and to reflect the effect of a 2-to-1 reverse stock split of Eterna's common stock that occurred immediately prior to the Merger.

Also as described above, the Novellus Acquisition closed on July 16, 2021. The Novellus Acquisition was accounted for as an asset acquisition, and substantially all of the value was attributed to in-process research and development (''IPR&D''), with the exception of the cash paid for the investment in NoveCite, which has been accounted for as an investment in equity securities. The IPR&D had no alternative future uses and no separate economic value from its originally intended purpose and was therefore expensed at the acquisition date.

October 2022 Reverse Stock Split

As approved by the Company's stockholders at the Company's Annual Meeting of Stockholders held on September 21, 2022, the Company effected a reverse stock split of its common stock at a ratio of 1-for-20, as

determined by the Company's Board of Directors within the parameters approved by the Company's stockholders (the ''October 2022 Reverse Stock Split''). The October 2022 Reverse Stock Split became effective under Delaware law at 11:59 p.m. Eastern time on October 16, 2022.

Upon the effectiveness of the October 2022 Reverse Stock Split, every twenty shares of the issued and outstanding common stock were automatically combined and reclassified into one issued and outstanding share of common stock. The October 2022 Reverse Stock Split did not affect any stockholder's ownership percentage of the common stock, alter the par value of the common stock or modify any voting rights or other terms of the common stock. The number of authorized shares of common stock under the Charter remains unchanged. No fractional shares were issued in connection with the October Reverse Stock Split. In lieu of any fractional shares to which a stockholder would otherwise be entitled, the Company paid an amount of cash equal to the product of (i) the fractional share to which the holder would otherwise be entitled and (ii) the then fair value of a share as determined in good faith by the Board. The Company paid an aggregate of $719 for a total of 175 fractional shares.

All share and per share data in this Annual Report on Form 10-K have been adjusted for all periods presented to reflect the October 2022 Reverse Stock Split.

Summary of Significant Accounting Policies

Use of Estimates

The preparation of consolidated financial statements in conformity with GAAP requires management to make estimates and assumptions that affect: (a) the reported amounts of assets and liabilities; (b) disclosure of contingent assets and liabilities at the date of the consolidated financial statements; (c) the reported amounts of expenses during the reporting period; and (d) the reported amount of the fair value of assets acquired in connection with business combinations. On an ongoing basis, the Company evaluates its estimates, including those related to the recoverability and useful lives of long-lived assets; stock-based compensation assumptions; valuation assumptions of warrants; contingencies; and the provision for income taxes, including the valuation allowance. The Company bases its estimates on a combination of historical experience and various other assumptions that it believes are reasonable under the circumstances. Actual results may differ materially from these estimates.

Cash, Cash Equivalents and Restricted Cash

The Company classifies highly liquid investments with a remaining contractual maturity at date of purchase of three months or less as cash equivalents. The Company had no cash equivalents as of December 31, 2022 or 2021.

Restricted cash consists of a cash collateralization of $4.1 million for a security deposit in the form of a letter of credit issued by the Company's commercial bank and delivered to the sublessor of the Sublease. The amount of required restricted cash collateral will decline in parallel with the reduction in the amount of the letter of credit over the term of the Sublease.

Property and Equipment

Property and equipment are recorded at cost and are depreciated over their estimated useful lives using the straight-line method. Laboratory and manufacturing equipment are depreciated over an estimated useful life of seven years. Leasehold improvements are depreciated over the shorter of their estimated useful life, or the lease term. Computer equipment are depreciated over an estimated useful life of three years. Upon retirement or other disposition of these assets, the cost and related accumulated depreciation of these assets are removed from the accounts and the resulting gain or losses are reflected in the results of operations. Expenditures for maintenance and repairs are charged to operations. Renewals and betterments are capitalized.

Goodwill

Goodwill represents the excess of the purchase price over the fair value of identifiable net assets acquired in the acquisition of IRX Therapeutics, Inc. (''IRX'') in November 2018 (the ''IRX Acquisition''), which was accounted for as a business combination. Goodwill is not amortized but is tested for impairment annually or if events occur or circumstances change that would reduce the fair value of a reporting unit below its carrying value. Because management evaluates the Company as a single reporting unit, goodwill is tested for impairment at the entity level by first performing a qualitative assessment to determine whether it is more likely than not that the fair value of the

entity is less than its carrying value. Such qualitative factors include macroeconomic conditions, industry and market considerations, cost factors, overall financial performance and other relevant events. If the entity does not pass the qualitative assessment, then the entity's carrying value is compared to its fair value. Goodwill is considered impaired if the carrying value of the entity exceeds its fair value.

IPR&D

IPR&D assets represent the fair value assigned to technologies that were acquired in connection with the IRX Acquisition, which have not reached technological feasibility and have no alternative future use. IPR&D assets are considered to be indefinite lived until the completion or abandonment of the associated research and development projects. During the period that the IPR&D assets are considered indefinite-lived, they are tested for impairment on an annual basis or more frequently if the Company becomes aware of any events occurring or changes in circumstances that indicate that the fair value of the IPR&D assets are less than their carrying amounts. If and when development is complete, which generally occurs upon regulatory approval, and the Company is able to commercialize products associated with the IPR&D assets, these assets are then deemed definite-lived and are amortized based on their estimated useful lives beginning at that point in time. If development is terminated or abandoned, the Company may have a full or partial impairment charge related to the IPR&D assets, calculated as the excess of carrying value of the IPR&D assets over fair value.

Research and Development

The Company expenses its research and development costs as incurred. Research and development expenses consist of costs incurred for company-sponsored research and development activities, as well as support for selected investigator-sponsored research. Upfront payments and milestone payments made for the licensing of technology are expensed as research and development in the period in which they are incurred if the technology is not expected to have any alternative future uses other than the specific research and development project for which it was intended. IPR&D that is acquired through an asset acquisition (as opposed to a business combination) and has no alternative future uses and, therefore, no separate economic values, is expensed to research and development costs at the time the costs are incurred.

The major components of research and development costs include preclinical study costs, clinical manufacturing costs, clinical study and trial expenses, insurance coverage for clinical trials, expensed licensed technology, expensed IPR&D, consulting, scientific advisors and other third-party costs, salaries and employee benefits, stock-based compensation expense, supplies and materials and allocations of various overhead costs related to our product development efforts.

The Company has contracted with third parties to perform various clinical study and trial activities in the development and testing of potential products. The financial terms of these agreements vary from contract to contract and may result in uneven payment flows. The Company accrues for third party expenses based on estimates of the services received and efforts expended during the reporting period. If the actual timing of the performance of the services or the level of effort varies from the estimate, the accrual is adjusted accordingly. The expenses for some third-party services may be recognized on a straight-line basis if the expected costs are expected to be incurred ratably during the period. Payments under the contracts depend on factors such as the achievement of certain events or milestones, the successful enrollment of patients, the allocation of responsibilities among the parties to the agreement, and the completion of portions of the clinical study or trial or similar conditions. Preclinical and clinical study and trial associated activities such as production and testing of clinical material require significant up-front expenditures.

Income Taxes

The Company records deferred tax liabilities and assets based on the differences between the consolidated financial statements carrying amounts and the tax basis of assets and liabilities, using enacted tax rates in effect in the years the differences are expected to reverse and establishing a valuation allowance when it was more likely than not that some portion or all of the deferred tax assets would not be realized. Income tax expense consists of the tax payable for the period and the change during the period in deferred tax assets and liabilities.

Tax benefits from uncertain tax positions are recognized only if it is more likely than not that the tax position will be sustained on examination by the taxing authorities, based on the technical merits of the position. The tax benefits recognized in the consolidated financial statements from such a position are measured based on the largest benefit that has a greater than 50% likelihood of being realized upon ultimate resolution. The Company has no material uncertain tax positions for any of the reporting periods presented.

Loss Per Share

Basic and diluted loss per common share have been computed by dividing the losses attributable to common stockholders by the weighted average number of common shares outstanding. The Company's basic and fully diluted loss per share calculations are the same because the increased number of shares that would be included in the diluted calculation from assumed exercise of common stock equivalents would be anti-dilutive to the net loss in each of the years shown in the consolidated financial statements.

Segment Reporting

The Company's chief operating decision maker, who is the chief executive officer, reviews operating results on a consolidated basis to make decisions about allocating resources and assessing performance of the Company. As a result, in accordance with ASC No. 280, *Segment Reporting,* the Company has determined that it operates as one operating segment.

Concentration of Credit Risk

The Company maintains its cash balances in financial institutions located in the United States. Accounts at each institution are insured by the Federal Deposit Insurance Corporation (''FDIC'') up to $250,000. The Company's cash balances are uninsured for deposit accounts that exceed the FDIC insurance limit.

In the Company's business, vendor concentrations could be indicative of vulnerabilities in the Company's supply chain, which could ultimately impact the Company's ability to continue its research and development activities. For the years ended December 31, 2022 and 2021, there was no vendor concentration related to the Company's research and development activities.

Fair Value of Financial Instruments

Fair value is defined as the price that would be received to sell an asset, or paid to transfer a liability, in an orderly transaction between willing market participants. A fair value hierarchy has been established for valuation inputs that gives the highest priority to quoted prices in active markets for identical assets or liabilities and the lowest priority to unobservable inputs. The fair value hierarchy is as follows:

- Level 1 Inputs – Valued based on quoted prices in active markets for identical assets or liabilities that the reporting entity has the ability to access at the measurement date.
- Level 2 Inputs – Valued based on inputs other than quoted prices included in Level 1 that are observable for the asset or liability, either directly or indirectly. These might include quoted prices for similar assets or liabilities in active markets, quoted prices for identical or similar assets or liabilities in markets that are not active, inputs other than quoted prices that are observable for the asset or liability (such as interest rates, volatilities, prepayment speeds, credit risks, etc.) or inputs that are derived principally from or corroborated by market data by correlation or other means.
- Level 3 Inputs – Valued based on inputs for which there is little or no market value, which require the reporting entity to develop its own assumptions.

The carrying amounts reported on the balance sheet for cash and cash equivalents, accounts receivable, prepaid assets and other current assets, accounts payable and accrued expenses, other current liabilities and other liabilities approximate fair value based due to their short maturities.

Leases

The Company accounts for its leases under ASC Topic 842, *Leases.* Operating lease liabilities represent the present value of lease payments not yet paid. Right-of-use (''ROU'') assets represent the Company's right to use an underlying asset and are based upon the operating lease liabilities adjusted for prepaid or accrued lease payments, initial direct costs, lease incentives and impairment of operating lease assets. If the interest rate implicit in the lease is not readily determinable, the Company uses the incremental borrowing rates for collateralized borrowings in an amount equal to the lease payments under similar terms.

The Company has elected the practical expedient to not separate non-lease components from the lease components to which they relate and instead account for each as a single lease component for all underlying asset

classes. Some leasing arrangements require variable payments that are dependent on usage or may vary for other reasons, such as payments for insurance, tax payments and other miscellaneous costs. The variable portion of payments contemplated in the lease that do not depend on an index or rate are not included in the ROU assets or lease liabilities. Rather, variable payments that do not depend on an index or rate are expensed when the obligation for those payments is incurred and are included in lease expenses. Accordingly, all expenses associated with a lease contract are accounted for as lease expenses.

The Company has also elected not to recognize ROU and lease liabilities for short-term leases that have a term of 12 months or less.

Commitment and Contingencies

The Company follows ASC No.450-20, *Loss Contingencies,* to report accounting for contingencies. Liabilities for loss contingencies arising from claims, assessments, litigation, fines and penalties, and other sources are recorded when it is probable that a liability has been incurred and the amount of the assessment can be reasonably estimated.

Stock-Based Compensation

The Company recognizes stock-based compensation expense for equity awards granted to employees, directors and certain consultants. The Company estimates the fair value of stock options using the Black-Scholes option pricing model. The fair value of stock options granted is recognized as expense over the requisite service period on a straight-lined basis.

Warrants

The Company accounts for common stock warrants as either equity-classified or liability-classified instruments based on an assessment of the specific terms of the warrants and applicable authoritative guidance in ASC 480, *Distinguishing Liabilities from Equity, and ASC 815, Derivatives and Hedging.* The assessment considers whether the warrants are freestanding financial instruments pursuant to ASC 480, meet the definition of a liability pursuant to ASC 480, or meet all of the requirements for equity classification under ASC 815, including whether the warrants are indexed to the Company's own stock and whether the holders of the warrants could potentially require net cash settlement in a circumstance outside of the Company's control, among other conditions for equity classification. This assessment, which requires the use of professional judgment, is conducted at the time of warrant issuance and as of each subsequent quarterly period end date while the warrants are outstanding.

Recent Accounting Standards

Newly Adopted Accounting Standards:

In July 2021, the FASB issued Accounting Standards Update (''ASU'') 2021-05, *Leases (Topic 842) – Lessors - Certain Leases with Variable Lease Payments,* which amends the lessor classification guidance to introduce additional criteria when classifying leases with variable lease payments that do not depend on a reference index or a rate. The Company adopted this ASU effective January 1, 2022, which did not have a material impact on its financial statements.

In May 2021, the FASB issued ASU 2021-04*, Earnings Per Share (Topic 260), Debt—Modifications and Extinguishments (Subtopic 470-50), Compensation—Stock Compensation (Topic 718), and Derivatives and Hedging—Contracts in Entity's Own Equity (Subtopic 815-40): Issuer's Accounting for Certain Modifications or Exchanges of Freestanding Equity-Classified Written Call Options*. ASU 2021-04 addresses the accounting for certain modifications or exchanges of freestanding equity-classified written call options. The Company adopted this ASU effective January 1, 2022, which did not have a material impact on the Company's financial statements.

In November 2021, the FASB issued ASU 2021-10, *Disclosures by Business Entities about Government Assistance,* which requires a business entity to disclose information about certain government assistance that it has received, including (i) the type of assistance, (ii) an entity's accounting for the assistance and (iii) the effect of the assistance on the entities accounting statements. The Company adopted this standard effective January 1, 2022, which did not have a material impact on the Company's financial statements. The Company has approximately $0.6 million in payroll tax refunds recorded in other receivable on the accompanying consolidated balance sheets as of December 31, 2022 and 2021 pursuant to the Employee Retention Credit program under the CARES Act.

Accounting Standards to be Adopted:

In June 2022, the FASB issued ASU No. 2022-03, *Fair Value Measurement (Topic 820): Fair Value Measurement of Equity Securities Subject to Contractual Sale Restrictions* (''ASU 2022-03''). The FASB issued ASU 2022-03 to (1) clarify the guidance in Topic 820, Fair Value Measurement, when measuring the fair value of an equity security subject to contractual restrictions that prohibit the sale of an equity security, (2) to amend a related illustrative example, and (3) to introduce new disclosure requirements for equity related securities subject to contractual sale restrictions that are measured at fair value in accordance with Topic 820. ASU 2022-03 clarifies that a contractual restriction on the sale of an equity security is not considered part of the unit of account of the equity security and, therefore, is not considered in measuring fair value. The guidance is effective for fiscal years beginning after December 15, 2023, and interim periods within those fiscal years with early adoption permitted. The Company is evaluating when to adopt the amendments in ASU 2022-02. The Company does not expect a material impact as a result of adopting this ASU.

4) Merger, Disposition and Acquisition Transactions

Merger

On August 12, 2020, Eterna, Eterna LLC and the Merger Sub entered into the Merger Agreement and consummated the Merger on March 25, 2021. The Merger was accounted for as a reverse acquisition, in which Eterna LLC was deemed the acquiring company for accounting purposes. Eterna LLC, as the accounting acquirer, recorded the assets acquired and liabilities assumed of Eterna in the Merger at their fair values as of the acquisition date.

Eterna LLC was determined to be the accounting acquirer based upon the terms of the Merger and other factors including that (i) Eterna LLC members received common stock in the Merger that represented 96.35% of Eterna's outstanding common stock on a fully diluted basis, (ii) all of the directors of Eterna immediately after the Merger were designated by Eterna LLC under the terms of the Merger Agreement and (iii) existing members of Eterna LLC's management became the management of Eterna immediately after the Merger.

At the closing of the Merger, all the outstanding membership interests of Eterna LLC converted into the right to receive an aggregate of approximately 1,999,000 shares of common stock, of which 53,000 shares were issued as compensation to Eterna LLC's financial advisor for its services to Eterna LLC in connection with the Merger.

The purchase price of $8.2 million, which represents the consideration transferred in the Merger to stockholders of Eterna immediately before the Merger, was calculated based on the closing price of $108 per share of common stock for approximately 76,000 shares that those stockholders owned on March 25, 2021 immediately prior to the Merger because that represented a more reliable measure of the fair value of consideration transferred in the Merger.

Under the acquisition method of accounting, the total purchase price has been allocated to the acquired tangible and intangible assets and assumed liabilities of Eterna based on their estimated fair values as of March 25, 2021, the Merger closing date. Because the consideration paid by Eterna LLC in the Merger is more than the estimated fair values of Eterna's net assets deemed to be acquired, goodwill is equal to the difference of approximately $8.6 million, which has been calculated using the fair values of the net assets of Eterna as of March 25, 2021.

The allocation of the purchase price to the tangible and intangible assets acquired and liabilities deemed to be assumed from Eterna, based on their estimated fair values as of March 25, 2021, is as follows (in thousands):

	Historical Balance Sheet of Eterna at March 25, 2021	Fair Value Adjustment to Eterna Pre-Merger Assets	Purchase Price Allocation
Cash and cash equivalents	$ 148	$ —	$ 148
Accounts receivable	103	—	103
Prepaid expense and other current assets	329	—	329
Property and equipment, net	1,015	—	1,015
Software development costs	1,296	(368)	928
Customers	—	548	548
Trade name	—	299	299
Accounts payable, accrued liabilities and other current liabilities	(3,781)	—	(3,781)
Net assets acquired, excluding goodwill	$ (890)	$ 479	$ (411)
Total consideration	$ 8,178		
Net assets acquired, excluding goodwill	(411)		
Goodwill	$ 8,589		

Eterna LLC was obligated under the Merger Agreement to have $10.0 million in cash and cash equivalents on its balance sheet at the effective time of the Merger. To ensure Eterna LLC had the required funds, certain beneficial holders of Eterna LLC's Class A membership interests entered into contractual commitments to invest $10.0 million into Eterna LLC immediately prior to the closing of the Merger. During March 2021, Eterna offered its Class A unit holders an additional 5% rights offering for an additional $0.5 million to be raised by a rights offering. Eterna received funds from the rights offering between February 17, 2021 and April 5, 2021.

Disposition

On March 26, 2021, Eterna sold its rights, title and interest in and to the assets relating to the business it operated (under the name NTN Buzztime, Inc.) prior to the Merger to eGames.com in exchange for a purchase price of $2.0 million and assumption of specified liabilities relating to that business. The sale was completed in accordance with the terms of the Asset Purchase Agreement. Details of the Disposition are as follows (in thousands):

Proceeds from sale:	
Cash	$ 132
Escrow	50
Assume advance/loans	1,700
Interest on advance/loans	68
Carrying value of assets sold:	
Cash and cash equivalents	(14)
Accounts receivable	(75)
Prepaids and other current assets	(124)
Property and equipment, net	(1,014)
Software development costs	(927)
Customers	(548)
Trade name	(299)
Goodwill	(8,589)
Other assets	(103)

Liabilities transferred upon sale:	
Accounts payable and accrued expenses	113
Obligations under finance leases	17
Lease liability	26
Deferred revenue	55
Other current liabilities	149
Transaction costs	(265)
Total loss on sale of assets	**$(9,648)**

Acquisition

On July 16, 2021, Eterna and Brooklyn Acquisition Sub, Inc. entered into the Novellus Acquisition Agreement. The Novellus Acquisition closed contemporaneously with the execution and delivery of the Novellus Acquisition Agreement. At the closing:

- Eterna acquired all of the outstanding equity interests of Novellus as the result of the merger of Brooklyn Acquisition Sub, Inc. with and into Novellus, following which, Novellus, as the surviving corporation, became Eterna's wholly owned subsidiary and Novellus Limited became Eterna's indirectly owned subsidiary; and
- Eterna acquired 25.0% of the total outstanding equity interests of NoveCite.

As consideration for the Novellus Acquisition, Eterna paid $22.9 million in cash and delivered approximately 351,000 shares of common stock, which under the terms of the Novellus Acquisition Agreement, were valued at a total of $102.0 million based on an agreed upon price of $290.51 per share. At the date of issuance, the fair value of the shares was approximately $58.7 million.

The Novellus Acquisition Agreement contained customary representations, warranties and certain indemnification provisions. Approximately 37,000 of the shares issued as consideration were placed in escrow to secure indemnification obligations to Eterna under the Novellus Acquisition Agreement, and all such shares were released to the sellers in July 2022. The Novellus Acquisition Agreement also contains certain non-competition and non-solicitation provisions pursuant to which Novellus LLC agreed not to engage in certain competitive activities for a period of five years following the closing, including customary restrictions relating to employees. No employees of Novellus Limited or Novellus prior to the Novellus Acquisition continued their employment, or were otherwise engaged by Eterna, immediately following the Novellus Acquisition.

In connection with the Novellus Acquisition, the co-founders of Novellus entered into lock-up agreements with respect to approximately 169,000 of the shares of common stock received in the Novellus Acquisition, and Eterna's Chairman of the Board and its former Chief Executive Officer and President entered into identical lock-up agreements with respect to their current holdings of Eterna stock. Each lock-up agreement extends for a period of three years, provided that up to 75% of the shares of common stock subject to the lock-up agreement may be released from the lock-up restrictions earlier if the price of common stock on the Nasdaq exceeds specified thresholds. The lock-up agreements include customary exceptions for transfers during the applicable lock-up period.

The Company executed the Novellus Acquisition to advance its evolution into a platform company with a pipeline of next generation mRNA cellular and gene editing programs.

Although Eterna acquired all of the outstanding equity interests of Novellus, the Company accounted for the Novellus Acquisition as an asset acquisition (as the assets acquired did not constitute a business as defined in ASC Topic 805, *Business Combinations*), and was measured by the amount of cash paid and by the fair value of the shares of common stock issued. As a result, substantially all of the value acquired was attributed to IPR&D, with the exception of the cash paid for the investment in NoveCite, which is being accounted for as an investment in equity securities, as discussed further below.

Eterna paid $22.9 million in cash, net of cash acquired, as part of the consideration for the Novellus Acquisition, of which $1.0 million was paid in cash for the investment in NoveCite. Eterna also issued approximately 351,000 shares of the Company's common stock, of which approximately 182,000 shares are unrestricted and 169,000 shares are subject to the three-year lockup. The unrestricted shares were valued at $201 per share, which was the closing price of Eterna's common stock on July 16, 2021. The fair value of the restricted shares was discounted

by approximately 35% to $130.60 per restricted share, which was derived from the average discount rate between the Black Scholes and Finnerty valuation models.The resulting fair value of the asset acquired is as follows (in thousands):

	Fair Value of Consideration
Cash paid	$22,882
Cash acquired	(28)
Unrestricted shares	36,628
Restricted shares	22,056
Total fair value of consideration paid	81,538
Less amount of cash paid for NoveCite investment	(1,000)
Fair value of IPR&D acquired	$80,538

IPR&D that is acquired through an asset purchase that has no alternative future uses and no separate economic values from its original intended purpose is expensed in the period the cost is incurred. Accordingly, the Company expensed the fair value of the IPR&D during the third quarter of 2021 in the amount of $80.5 million.

Investment in NoveCite

As a result of the Novellus Acquisition, Eterna acquired and currently owns 25% of NoveCite, and Citius Pharmaceuticals, Inc. (''Citius'') owns the remaining 75%. A member of the Company's management is entitled to hold one of three board seats on NoveCite's board of directors. Citius' s officers and directors hold the other two board seats. The Company is accounting for its interest in NoveCite under ASC Topic 323, *Investments – Equity Method and Joint Ventures.* The investment was recorded at cost, which was $1.0 million, and is adjusted for the Company's share of NoveCite's earnings or losses, which are reflected in the accompanying consolidated statements of operations. The investment may also reflect an equity loss in the event that circumstances indicate an other-than-temporary impairment. For the year ended December 31, 2022, the Company recorded approximately $0.9 million in losses from its investment in NoveCite, and, of the $0.9 million loss for year ended December 31, 2022, $0.5 million related to NoveCite's year ended December 31, 2021. The Company does not guarantee obligations of NoveCite nor is it otherwise committed to provide financial support for NoveCite. Therefore, the Company will record losses only up to its investment carrying amount.

5) Fair Value of Financial Instruments

There were no liabilities measured at fair value as of December 31, 2021. The following tables summarize the liabilities that are measured at fair value as of December 31, 2022 (in thousands):

	As of December 31, 2022		
Description	**Level 1**	**Level 2**	**Level 3**
Liabilities:			
Warrant liabilities - Q1-22 Common Warrants	$—	$—	$331
Total	$—	$—	$331

On March 9, 2022, upon closing the Q1-22 PIPE Transaction, the Company issued to the Q1-22 PIPE Investor the Q1-22 Pre-Funded Warrants, exercisable for approximately 68,000 shares of common stock, and the Q1-22 Common Warrants, exercisable for approximately 343,000 shares of common stock. On July 12, 2022, the Q1-22 PIPE Investor exercised all of the Q1-22 Pre-Funded Warrants at an exercise price of $0.10 per share for an aggregate exercise price of approximately $7,000 in cash, and the Company issued 68,000 shares of common stock to the Q1-22 PIPE Investor upon receipt of the cash proceeds. Following the exercise, no Q1-22 Pre-Funded Warrants remained outstanding. See Note 15 for more information related to the Q1-22 PIPE Transaction.

The Q1-22 Common Warrants and Q1-22 Pre-Funded Warrants were accounted for as liabilities under ASC 815-40, *Derivatives and Hedging, Contracts in Entity's Own Equity* (''ASC 815-40''), as these warrants provide for a cashless settlement provision that does not meet the requirements of the indexation guidance under ASC 815-40. These warrant liabilities were measured at fair value at inception and are then subsequently measured on a recurring basis, with changes in fair value presented within the Company's statements of operations.

The Company uses a Black-Scholes option pricing model to estimate the fair value of the Q1-22 Common Warrants, which is considered a Level 3 fair value measurement. Certain inputs used in this Black-Scholes pricing model may fluctuate in future periods based upon factors that are outside of the Company's control. A significant change in one or more of these inputs used in the calculation of the fair value may cause a significant change to the fair value of the Company's warrant liabilities, which could also result in material non-cash gains or losses being reported in the Company's consolidated statement of operations.

The estimated fair value of the Q1-22 Pre-Funded Warrants was deemed a Level 2 measurement as all significant inputs to the valuation model used to estimate the fair value of the Q1-22 Pre-Funded Warrants were directly observable from the Company's publicly-traded common stock. Upon exercise of the Q1-22 Pre-Funded Warrants on July 12, 2022, the Company reclassified the approximately $0.9 million fair value of the Pre-Funded Warrants to equity.

The fair values of the Q1-22 Common Warrants and the Q1-22 Pre-Funded Warrants at the issuance date totaled $12.6 million in the aggregate, which was $0.6 million more than the $12.0 million proceeds received in the Q1-22 PIPE Transaction. The excess $0.6 million represents an inducement to the purchaser to enter into the Q1-22 PIPE Transaction and was recorded in warrant liabilities expense in the accompanying consolidated statement of operations.

The Company remeasured the fair value of the Q1-22 Common Warrants as of December 31, 2022. The following table presents the changes in the warrant liabilities from the issuance date (in thousands):

	Q1-22 Pre-Funded Warrants (Level 2)	Q1-22 Common Warrants (Level 3)	Total Warrant Liabilities
Fair value at January 1, 2022	$ —	$ —	$ —
Fair value at March 9, 2022 (issuance date)	2,646	9,943	12,589
Change in fair value of warrant liabilities	(1,779)	(9,612)	(11,391)
Exercise of Q1-22 Pre-Funded Warrants	(867)	—	(867)
Fair value at December 31, 2022	$ —	$ 331	$ 331

6) Property and Equipment

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

	As of December 31,	
	2022	2021
Laboratory and manufacturing equipment	$ 28	$ 258
Leasehold improvements	—	464
Computer equipment and programs	240	155
	268	877
Less accumulated depreciation and amortization	(32)	(207)
Property and equipment, net	$236	$ 670

During the year ended December 31, 2022, the Company consolidated its research and development activities in Cambridge, Massachusetts and entered into lease termination agreements for its Brooklyn, New York and San Diego, California facilities. (See Note 7 for more information on lease terminations.) As a result, the Company disposed of certain assets it would no longer use and recognized a loss on disposal of fixed assets of approximately $0.3 million, which was composed of $0.6 million in remaining net book value of such assets, offset by proceeds received from selling certain fixed assets for approximately $0.3 million.

Depreciation expense totaled $161,000 and $117,000 for the years ended December 31, 2022 and 2021, respectively. No depreciation expense is recorded on fixed assets in process until such time as the assets are completed and are placed into service.

7) Leases

The Company has operating leases for office and laboratory space in the borough of Manhattan in New York, New York, in Cambridge, Massachusetts and in Somerville, Massachusetts, which expire in 2026, 2028, and 2032 respectively.

The Company also leased a facility in Brooklyn, New York (the ''Brooklyn Lease''). On March 5, 2022, the Company entered into an agreement to assign the Brooklyn Lease to Regen Lab USA LLC (''Regen''). Regen agreed to purchase certain equipment from the Company for $50,000, which partially reimbursed the Company for certain existing unamortized leasehold improvements, and to reimburse the Company for the existing security deposit the Company had under the Brooklyn Lease of approximately $63,000.

On March 25, 2022, the Company entered into an Assignment and Assumption of Lease Agreement (the ''Assignment Agreement'') with Regen. The effective date of the assignment was March 28, 2022. Under the Assignment Agreement, Regen assumed all of the obligations, liabilities, covenants and conditions of the Company as tenant under the Brooklyn Lease. As a result of the lease assignment, the Company wrote off the remaining ROU asset balance of approximately $1.4 million and the corresponding lease liability of approximately $1.5 million.

On March 31, 2022, the Company entered into a facility lease in San Diego, California (the ''San Diego Lease'') with Torrey Pines Science Center Limited Partnership for approximately 5,200 square feet of laboratory and office space. The term of the San Diego Lease was 62 months and the lease commencement date was April 19, 2022. The Company recorded a $1.7 million ROU asset and $1.7 million lease liabilities for the San Diego Lease.

During 2022, the Company decided to consolidate its research and development efforts in Cambridge, Massachusetts, and the Company determined to sublease the San Diego laboratory and office space. As a result, the Company recognized an impairment charge of approximately $0.8 million on the San Diego Lease ROU asset during 2022, which is recorded in general and administrative expense on the consolidated statements of operations.

On November 30, 2022, the Company and the lessor of the San Diego Lease entered into a lease termination agreement, as amended on December 29, 2022 (the ''Lease Termination Agreement''), pursuant to which the lessor agreed to terminate the San Diego lease effective January 31, 2023 provided that (i) the Company pay a $0.1 million lease termination fee and (ii) the lessor was able to enter into a new lease for the space with a new tenant by January 15, 2023. On January 9, 2023, the lessor provided notice to the Company that it had entered into a new lease with a new tenant, and the Company paid the $0.1 million termination fee. As a result, the San Diego Lease terminated on January 31, 2023.

The Lease Termination Agreement was accounted for as a modification to the San Diego Lease rather than as a lease termination because the Company did not contemporaneously terminate the San Diego Lease upon the November 30, 2022 modification date and had a continued right-of-use of the facility through January 31, 2023. As a result, the Company remeasured the remaining lease payments, including the $0.1 million termination fee, and reduced the lease liability the Company had on its balance sheet at the time of the modification by approximately $1.4 million to the present value of the remeasured lease liability of approximately $0.2 million. For a lease modification that is not accounted for as a separate contract, a lessee recognizes the amount of the remeasured lease liability as an adjustment to the corresponding ROU asset without affecting profit or loss. However, because the ROU asset balance as of the modification date was only $0.8 million due to the impairment charge of $0.8 million the Company recognized during the second quarter of 2022 (as discussed above), the Company reduced the ROU asset to zero, and the remaining $0.6 million of the $1.4 million adjustment was recognized as a credit to general and administrative expense on the consolidated statement of operations for the year ended December 31, 2022.

On October 18, 2022, the Company entered into the Sublease with E.R. Squibb & Sons, L.L.C., a Delaware limited liability company and subsidiary of Bristol-Myers Squibb Company (''Sublessor''), for office, laboratory and research and development space (the ''Premises''). The Premises consist of approximately 45,500 square feet on the ninth floor of the building currently under construction located at 250 Water Street, Somerville, Massachusetts 02141.

Payments of the Sublease rent commence on the date that is the earlier of (i) the date that the Company commences business operations from the Premises and (ii) the one-year anniversary of the date that Sublessor obtained the primary landlord's consent for the Sublease, which was November 29, 2022 (such applicable date, the ''Rent Commencement Date''). The Sublease has a term of 10 years from the Rent Commencement Date (the ''Term''), subject to a five-year extension in accordance with the terms of the Sublease.

Pursuant to the Sublease, the Company paid the Sublessor a security deposit in the form of a letter of credit in the amount of approximately $4.1 million. Provided there are no events of default by the Company under the Sublease, the letter of credit will be reduced on an incremental basis throughout the Term. Pursuant to the Sublease, the Company has agreed to pay base rent of approximately $0.5 million per month during the first year of the Term, increasing on an incremental basis each subsequent year of the Term for a total of approximately $63.0 million in base rental payments, as well as parking and traditional lease expenses, including certain taxes, operating expenses and utilities.

Pursuant to the Sublease, the Sublessor will provide the Company with a tenant improvement allowance of $190 per rentable square foot, or $8.6 million. Tenant improvements to the Premises in excess of this amount, if any, will be at the Company's own cost. As of December 31, 2022, the Premises had not been made available for the Company to begin the construction of the tenant improvements. It is expected that the Premises will be made available to begin the construction in March or April 2023, and it is anticipated that the construction will be complete and ready for operational use in November or December 2023. As a result, the commencement date of the Sublease did not occur as of December 31, 2022, and accordingly, the Company did not recognize a lease liability and corresponding ROU asset for the Sublease as of December 31, 2022.

As of December 31, 2022, the Company had incurred approximately $0.6 million in costs in connection with the Sublease, which consisted of approximately $0.5 million for the architect to design the tenant improvements to the Premises and for a project manager to manage the construction of the tenant improvements as well as approximately $0.1 million in bank fees related to the issuance of the letter of credit discussed above. These costs are recorded in other assets in the accompanying consolidated balance sheet as of December 31, 2022.

For the years ended December 31, 2022 and 2021, the net operating lease expenses were as follows (in thousands):

	Years ended December 31,	
	2022	2021
Operating lease expense	$595	$688
Sublease income	(84)	(84)
Variable lease expense	150	19
Total lease expense	$661	$623

The tables below show the beginning balances of the operating ROU assets and lease liabilities as of January 1, 2022 and the ending balances as of December 31, 2022, including the changes during the period (in thousands).

	Operating Lease ROU Assets
Operating lease ROU assets at January 1, 2022	$ 2,567
Initial measurement of ROU asset	1,706
Amortization of operating lease ROU assets	(336)
Impairment of ROU asset	(772)
Remeasurment of ROU asset	(813)
Reclassification from fixed assets to ROU assets	50
Write off of ROU asset due to lease termination	(1,372)
Operating lease ROU assets at December 31, 2022	$ 1,030

	Operating Lease Liabilities
Operating lease liabilities at January 1, 2022	$ 2,723
Initial measurement of operating lease liabilities	1,706
Principal payments on operating lease liabilties	(340)
Remeasurment of lease liability	(1,454)
Write off of lease liability due to lease termination	(1,453)
Operating lease liabilities at December 31, 2022	1,182
Less non-current portion	887
Current portion at December 31, 2022	$ 295

As of December 31, 2022, the Company's operating leases had a weighted-average remaining life of 4.5 years with a weighted-average discount rate of 9.98%. The maturities of the operating lease liabilities are as follows (in thousands):

	As of December 31, 2022
2023	$ 403
2024	272
2025	274
2026	267
2027	163
Thereafter	82
Total payments	1,461
Less imputed interest	(279)
Total operating lease liabilities	$1,182

The maturities of the operating lease liabilities show in the table above does not include future payments due under the Sublease that the Company entered into in October 2022, as the commencement date of the Sublease had not begun as of December 31, 2022, and therefore, the Company did not record a corresponding lease liability and ROU asset.

Sublease Agreement

In April 2019, the Company entered into a sublease agreement with Nezu Asia Capital Management, LLC (the ''Tenant''), whereby the Tenant agreed to sublease approximately 999 square feet of space currently rented by the Company in the borough of Manhattan in New York, New York commencing on May 15, 2019. The term of this sublease expires on October 31, 2026 with no option to extend the sublease term. Rent payments provided by the Tenant under the sublease agreement began on September 1, 2019. The sublease agreement stipulates an annual rent increase of 2.25%. The Tenant is also responsible for paying to the Company all tenant energy costs, annual operating costs, and annual tax costs attributable to the subleased space during the term of the sublease.

The Company received sublease payments of approximately $0.1 million for each of the years ended December 31, 2022 and 2021, respectively. In accordance with ASC Topic 842, the Company treats the sublease as a separate lease, as the Company was not relieved of the primary obligation under the original lease. The Company continues to account for the Manhattan lease as a lessee and in the same manner as prior to the commencement date of the sublease. The Company accounts for the sublease as a lessor of the lease. The sublease is classified as an operating lease, as it does not meet the criteria of a sale-type or direct financing lease.

The following tables shows the future payments the Company expects to receive from the Tenant over the remaining term of the sublease (in thousands):

	As of December 31, 2022
2023	$ 84
2024	86
2025	88
2026	75
	$333

8) In-Process Research & Development and Goodwill

In-Process Research & Development

In 2018, the Company acquired IRX, which was accounted for as a business combination. The Company recorded IPR&D in the amount of $6.0 million, which represented the fair value assigned to technologies that were acquired in connection with the IRX acquisition and which have not reached technological feasibility and have no alternative future use.

In June 2022, the Company received results from the INSPIRE phase 2 trial of IRX-2, a multi-cytokine biologic immunotherapy, in patients with newly diagnosed stage II, III or IVA squamous cell carcinoma of the oral cavity. The IRX-2 multi-cytokine biologic immunotherapy represents substantially all the fair value assigned to the technologies of IRX that the Company acquired. Despite outcomes that favored IRX-2 in certain predefined subgroups, the INSPIRE trial did not meet the primary endpoint of Event-Free Survival. Significant additional clinical development work would be required to advance IRX-2 in the form of additional Phase 2 and 3 studies to further evaluate the treatment effect of IRX-2 in patient subgroups and in combination with checkpoint inhibitor therapies. The INSPIRE trial was the only Company-sponsored study of IRX-2. Based on the totality of available information, the Company currently does not have plans to further develop the IRX-2 product candidate. As such, the Company determined that the carrying value of the IPR&D asset was impaired and recognized a non-cash impairment charge of approximately $6.0 million on the consolidated statement of operations during 2022, which reduced the value of the asset to zero.

Goodwill

The Company recorded goodwill in the amount of $2.0 million related to the IRX Acquisition. As of December 31, 2022, the Company performed a qualitative assessment to determine whether it was more likely than not that the fair value of the entity is less than its carrying value of goodwill. Such qualitative factors include macroeconomic conditions, industry and market considerations, cost factors, overall financial performance and other relevant events. Due to the decline in the Company's stock price during 2022, the Company determined there were indications of impairment of the goodwill. Accordingly, the Company proceeded to a quantitative assessment of impairment and determined that the fair value of the reporting unit exceeded the carrying amount of goodwill, and therefore, the goodwill was not impaired as of December 31, 2022.

9) Related Party Transactions

Agreements Related to Factor Bioscience and Dr. Matthew Angel

In September 2022, the Company entered into a Master Services Agreement (the ''MSA'') with Factor Bioscience Inc. (''Factor Bioscience''), pursuant to which Factor Bioscience has agreed to provide services to the Company as agreed between the Company and Factor Bioscience and as set forth in one or more work orders under the MSA, including the first work order included in the MSA (''WO1''). Under WO1, Factor Bioscience has agreed to provide the Company with mRNA cell engineering research support services, including access to certain facilities, equipment, materials and training, and the Company has agreed to pay Factor Bioscience an initial fee of $5.0 million, payable in twelve equal monthly installments of approximately $0.4 million. Of the $5.0 million, the Company allocated $3.5 million to the License Fee Obligation (as defined below). Following the initial 12-month period, the Company has agreed to pay Factor Bioscience a monthly fee of $0.4 million until such time as WO1 is terminated. The Company paid a deposit of $0.4 million, which will be applied to the last month of the first work order.

The Company may terminate WO1 under the MSA on or after the second anniversary of the date of the MSA, subject to providing Factor Bioscience with 120 days' prior notice. Factor Bioscience may terminate such work order only on and after the fourth anniversary of the date of the MSA, subject to providing the Company with 120 days' prior notice. The MSA contains customary confidentiality provisions and representations and warranties of the parties, and the MSA may be terminated by ether party upon 30 days' prior notice, subject to any superseding termination provisions contained in a particular work order.

In connection with entering into the MSA, Factor Bioscience's subsidiary, Factor Limited, entered into a waiver agreement (the ''Waiver Agreement'') with Eterna LLC, pursuant to which Factor Limited agreed to waive payment of $3.5 million otherwise payable to it (the ''License Fee Obligation'') in October 2022 by Eterna LLC under the Original Factor License Agreement, as defined in Note 13, *License Agreements*. Under the terms of the Waiver Agreement, the License Fee Obligation is waived conditionally on the Company paying Factor Bioscience amounts due under the MSA.

As a result of entering into the Waiver Agreement and the MSA, the Company recognized $3.5 million in research and development expense, as the license does not have an alternative future use, and a corresponding liability for the License Fee Obligation. As of December 31, 2022, there was approximately $3.0 million of the License Fee Obligation remaining, which is recorded on the accompanying consolidated balance sheet in the ''due to related party'' line items.

In September 2022, Novellus and Eterna entered into a Second Amendment to the Limited Waiver and Assignment Agreement (the ''Waiver and Assignment Agreement'') with Drs. Matthew Angel and Christopher Rohde (the ''Founders'') whereby the Company has agreed to be responsible for all future, reasonable and substantiated legal fees, costs, settlements and judgments incurred by the Founders, the Company or Novellus for certain claims and actions and any pending or future litigation brought against the Founders, Novellus and/or the Company by or on behalf of the Westman and Sowyrda legal matters described in Note 12 (the ''Covered Claims''). The Founders will continue to be solely responsible for any payments made to satisfy a judgement or settlement of any pending or future wage act claims. Under the Waiver and Assignment Agreement, the Founders agreed that they are not entitled to, and waived any right to, indemnification or advancement of past, present or future legal fees, costs, judgments, settlement or other liabilities they may have been entitled to receive from the Company or Novellus in respect of the Covered Claims. The Company and the Founders will share in any recoveries up to the point at which the parties have been fully compensated for legal fees, costs and expenses incurred, with the Company retaining any excess recoveries. The Company has the sole authority to direct and control the prosecution, defense and settlement of the Covered Claims.

In September 2022, the Company entered into an assignment and assumption of contracts agreement (the ''Assignment and Assumption Agreement'') with Factor Bioscience, pursuant to which the Company assumed certain contracts with third parties that Factor Bioscience had previously entered into in anticipation of entering into a sublease for premises in Somerville, Massachusetts. In October 2022, the Company entered into a sublease for the premises (see Note 7). Under the Assignment and Assumption Agreement, the Company agreed to reimburse Factor Bioscience for costs already incurred or paid by it under the assumed contracts in the amount of approximately $0.1 million, and the Company assumed the future obligations under these contracts, which relate to the design and build-out of the subleased space.

In November 2022, following the expiration of one of the delineated milestone deadlines for certain regulatory filings required under the Novellus-Factor License Agreement (as defined in Note 12), which permitted Factor Limited to terminate the license granted to Novellus Limited thereunder, the Company entered into the first amendment to the Original Factor License Agreement (the ''Amended Factor License Agreement''), pursuant to which, among other things, Factor Limited granted to Eterna LLC an exclusive, sublicensable license under certain patents owned by Factor Limited (the ''Factor Patents'') for the purpose of identifying and pursuing certain opportunities to grant to third parties sublicenses to the Factor Patents. The Amended Factor License Agreement also (i) terminated the Novellus-Factor License Agreement, (ii) confirmed Factor Limited's grant to Eterna LLC of the rights and licenses Novellus Limited previously granted to Eterna LLC under the Novellus-Factor License Agreement on the same terms and conditions as granted by Novellus Limited to Eterna LLC under such agreement, (iii) confirmed that sublicense granted by Novellus Limited in accordance with the Novellus-Factor License

Agreement to NoveCite (as discussed in Note 12), survived termination of the Novellus-Factor License Agreement; and (iv) removed Novellus Limited from the Amended Factor License Agreement and the NoveCite Agreement (as defined in Note 12) and replaced Novellus Limited with Factor Limited as the direct licensor to Eterna LLC and NoveCite under such agreements, respectively.

The agreements discussed above have been deemed related party transactions, as the Company's Chief Executive Officer, Dr. Matthew Angel, is also the Chairman and Chief Executive Officer of Factor Bioscience and a Director of Factor Limited.

Exacis Option Agreement

On October 8, 2022, the Company entered into an option agreement (the ''Exacis Option Agreement'') with Exacis Biotherapeutics, Inc., a Delaware corporation (''Exacis''), pursuant to which Exacis granted the Company the option to negotiate and enter into an exclusive worldwide sublicense by December 31, 2022 to certain technology licensed by Exacis for the treatment of cancer in humans (the ''Exacis Option''). Under the Exacis Option Agreement, the Company paid Exacis a fee of $0.3 million for the Exacis Option, which would be creditable against the fees or purchase price payable under any such license if entered into by the Company in accordance with the Exacis Option Agreement. The Exacis Option Agreement provided for certain payments upon the execution of a definitive license agreement, which would become payable only upon execution and in accordance with the terms of the applicable license agreement, if any. The Company decided not to exercise the Exacis Option, and the Exacis Option Agreement expired in accordance with its terms on December 31, 2022.

The Exacis Option Agreement has been deemed a related party transaction, as one of the Company's Board members, Dr. Gregory Fiore, is the Chief Executive Officer of Exacis. Additionally, the Company's Chief Executive Office, Dr. Matthew Angel, is Chairman of Exacis' scientific advisory board. Dr. Angel is also the Chairman and Chief Executive Officer of Factor Bioscience LLC, which is the majority shareholder of Exacis.

Q4-22 PIPE Transaction

On November 23, 2022, the Company entered into the Q4-22 Purchase Agreement with the Q4-22 PIPE Investors in respect of the Q4-22 PIPE Transaction, pursuant to which the Company issued and sold to the Q4-22 PIPE Investors approximately 2,185,000 units, each unit consisting of (i) one share of common stock and (ii) two Q4-22 Warrants, at a purchase price of $3.53 per unit (inclusive of $0.125 per Q4-22 Warrant). The Company received aggregate gross proceeds of approximately $7.7 million, The Q4-22 PIPE Transaction closed on December 2, 2022.

Each Q4-22 Warrant becomes exercisable six months following the date of closing, expires five-and-one-half years following such date, and is subject to customary adjustments.

Mr. Charles Cherington, Chairman of the Company's Board of Directors, and Mr. Nicholas Singer, a director of the Company, participated in the Q4-22 PIPE Transaction on the same terms and subject to the same conditions as all other Q4-22 PIPE Investors.

On the closing date of the Q4-22 PIPE Transaction, the Company and the Q4-22 PIPE Investors, including Messrs. Cherington and Singer, entered into a registration rights agreement, pursuant to which the Company has agreed to prepare and file a registration statement on Form S-3 with the Securities and Exchange Commission no later than 30 days following the date on which the Company becomes eligible to use Form S-3 to register the resale of the shares of common stock included in the units described above and the shares of common stock issuable upon exercise of the Q4-22 Warrants.

10) Accrued Expenses

Accrued expenses consisted of the following (in thousands):

	As of December 31,	
	2022	**2021**
Accrued compensation	$1,065	$656
Legal fees and related	1,138	241
Clinical	570	200

	As of December 31,	
	2022	2021
Q4-22 PIPE	208	—
Other	645	152
Total accrued expenses	$3,626	$1,249

11) Debt

Loans Payable

In connection with the IRX Acquisition in 2018, Eterna LLC assumed certain notes payable (the ''IRX Notes'') in the amount of $0.4 million. On January 27, 2020, the IRX Notes were amended to extend the maturity date to the earlier of (i) a change of control, as defined in the IRX Notes, and (ii) December 31, 2021. On December 31, 2021, the Company paid the outstanding $0.4 million in principal plus accrued and unpaid interest of approximately $0.2 million under the IRX Notes, and the Company has no further obligations thereunder.

Payment Protection Program Loan

On May 4, 2020, Eterna LLC issued a note in the principal amount of approximately $0.3 million to Silicon Valley Bank evidencing a loan (the ''Eterna LLC PPP Loan'') that Eterna LLC received under the Paycheck Protection Program (the ''PPP'') of the Coronavirus Aid, Relief, and Economic Security Act administered by the U.S. Small Business Administration (the ''CARES Act''). Eterna LLC PPP Loan incurred interest at a rate of 1.0% per annum.

Under the terms of the CARES Act, certain amounts of the Eterna LLC PPP Loan could be forgiven if they were used for qualifying expenses, as described in the CARES Act. In September 2021, the lender informed Eterna LLC that the U.S Small Business Administration approved the forgiveness of 100% of the outstanding principal and interest of the Eterna LLC PPP Loan. As a result, the Company recognized a gain during 2021 of $0.3 million during recorded in other (expense) income, net, on the accompanying consolidated statements of operations. The Company has no further obligations under this loan.

12) Commitments and Contingencies

Litigation Matters

The Company is involved in litigation and arbitrations from time to time in the ordinary course of business. Legal fees and other costs associated with such actions are expensed as incurred. In addition, the Company assesses the need to record a liability for litigation and contingencies. The Company reserves for costs relating to these matters when a loss is probable, and the amount can be reasonably estimated.

Dhesh Govender v. Eterna Therapeutics LLC, et al., Index No. 650847/2021 (N.Y. Sup. Ct. N.Y. Cty. 2021)

On or about February 5, 2021, Dhesh Govender, a former short-term consultant of Eterna LLC, filed a complaint against Eterna LLC and certain individuals that plaintiff alleged were directors of Eterna LLC. Plaintiff alleged that Eterna LLC and certain of its officers and directors (''defendants'') engaged in unlawful and discriminatory conduct based on race, national origin and hostile work environment. Plaintiff also asserted various breach of contract, fraud and quantum meruit claims based on an alleged oral agreement pursuant to which he alleged Eterna LLC agreed to hire him as an executive once the Merger was completed. On December 15, 2022, the parties executed a Confidential Settlement Agreement and Release of All Claims. On January 11, 2023, the parties filed a Stipulation to Discontinue in the Court action. Also on January 11, 2023, Govender voluntarily dismissed the arbitration.

John Westman v. Novellus, Inc., Christopher Rohde, and Matthew Angel, Civil Action No. 2181CV01949 (Middlesex County (Massachusetts) Superior Court)

On or about September 7, 2021, John Westman, a former employee of Novellus, Inc. filed a Complaint in Middlesex County (Massachusetts) Superior Court against Novellus, Inc. and Novellus, Inc.'s founders and former executives, Dr. Christopher Rohde and Dr. Matthew Angel (collectively, ''Defendants''). The case includes

allegations that Novellus, Inc. violated the Massachusetts Wage Act (''Wage Act''). Eterna acquired Novellus, Inc. on July 16, 2021. Mr. Westman's claims relate to alleged conduct that took place before Eterna acquired Novellus, Inc. Westman agreed to dismiss the lawsuit and proceed with his claims in arbitration. Following mediation, the parties settled this dispute in December 2022.

The aggregate settlement amount payable by the Company for the two matters discussed above is approximately $0.5 million.

Novellus, Inc. v. Sowyrda et al., C.A. No. 2184CV02436-BLS2

On October 25, 2021 Novellus, Inc. filed a complaint in the Superior Court of Massachusetts, Suffolk County, against former Novellus, Inc. employees Paul Sowyrda and John Westman and certain other former investors in Novellus LLC (Novellus, Inc.'s former parent company prior to our acquisition of Novellus, Inc.), alleging breach of fiduciary duty, breach of contract and civil conspiracy. Eterna acquired Novellus, Inc. on July 16, 2021. On May 27, 2022 Novellus, Inc. amended the complaint to withdraw all claims against all defendants except Paul Sowyrda and John Westman. On July 1, 2022, Westman filed a motion to compel arbitration or in the alternative, to stay the litigation pending the disposition of certain litigation in the Court of Chancery for the State of Delaware filed by Mr. Sowyrda against Novellus LLC, Dr. Christopher Rohde, Dr. Matthew Angel, Leonard Mazur and Factor Bioscience, Inc. captioned *Zelickson et al., v. Angel et al.,* C.A. 2021-1014-JRS and by Westman against Novellus LLC captioned *Westman v. Novellus LLC*, C.A. No. 2021-0882-NAC (the ''Delaware Actions''). On July 1, 2022, Sowyrda answered the complaint and asserted counterclaims against Novellus, Inc, and third-party defendants Dr. Matthew Angel and Dr. Christopher Rohde alleging violations of the Massachusetts Wage Act, Massachusetts Minimum Fair Wage Law, the Fair Labor Standards Act, breach of contract, unjust enrichment and quantum meruit. Sowyrda also joined in Westman's motion to stay the case pending the Delaware Actions. Novellus, Inc.'s claims and Mr. Sowyrda's counterclaims relate to alleged conduct that took place before Eterna acquired Novellus, Inc.

On November 15, 2022, prior to a decision on Westman's and Sowyrda's motion to compel or stay, the Parties agreed to voluntarily dismiss and consolidate the Delaware Actions with this action. On December 15, 2022, Sowyrda filed an Amended Answer to the Amended Complaint, asserted affirmative defenses and filed Amended Counterclaims against Dr. Angel, Dr. Rohde, Novellus LLC, Novellus Inc., Factor Bioscience Inc., and Eterna Therapeutics Inc. (''Counterclaim Defendants'') alleging against various Counterclaim Defendants breach of contract, breaches of the implied duty of good faith and fair dealing, breaches of fiduciary duty, breaches of the operating agreement, aiding and abetting breaches of fiduciary duty, tortious interference with contract, equitable accounting, violations of the Massachusetts Wage Act, Massachusetts Minimum Fair Wage Law, the Fair Labor Standards Act, unjust enrichment, and quantum meruit. Also on December 15, 2022, Westman filed an answer to the Amended Complaint and asserted similar counterclaims against the same Counterclaim Defendants. Westman and Sowyrda each asserted claims for indemnification and/or advancement against Novellus, Inc. On January 11, 2023, Westman and Sowyrda served a joint motion to enforce their advancement and/or indemnification rights against Novellus Inc. Novellus Inc. vigorously opposes this motion and served its opposition on January 27, 2023. On February 8, 2023, Westman and Sowyrda served a reply in support of their motion to enforce indemnification/advancement rights, and submitted the motion to the Court. Novellus Inc. answered Westman and Sowyrda's counterclaims on January 27, 2023, denying liability. The remaining Counterclaim Defendants served a motion to dismiss most of the remaining counterclaims on January 27, 2023. Sowyrda's and Westman's oppositions to the motion to dismiss were served on March 3, 2023, and Counterclaim Defendants' reply is due March 24, 2023, at which point the motion to dismiss will be fully briefed. The Court announced that it would hold oral argument on April 5, 2023 on (a) the Counterclaim Defendants' motion to dismiss, and (b) Sowyrda's and Westman's motion to enforce. The parties attended an initial status and scheduling conference with the Court on February 7, 2023. The Court deferred entering a case scheduling until after the April 5 hearing.

Under applicable Delaware law and Novellus Inc.'s organizational documents, the Company may be required to advance or reimburse certain legal expenses incurred by former officers and directors of Novellus, Inc. in connection with the foregoing Westman and Sowyrda matters. However, a future advance or reimbursement is not currently probable nor can it be reasonably estimated.

Emerald Private Equity Fund, LLC Matter

By a letter dated July 7, 2021, Emerald Private Equity Fund, LLC (''Emerald''), a stockholder of Eterna, made a demand pursuant to 8 Del. C. 220 to inspect certain books and records of Eterna. The stated purpose of the demand was to investigate possible wrongdoing by persons responsible for the implementation of the Merger and the issuance

of paper stock certificates, including investigating whether: (i) Eterna's stock certificates were issued in accordance with the Merger Agreement; (ii) certain restrictions on the sale of Eterna common stock following the Merger were proper and applied without favor; (iii) anyone received priority in post-Merger issuances of Eterna's stock certificates that allowed them to benefit from an increase in the trading price of Eterna's common stock; and (iv) it should pursue remedial measures and/or report alleged misconduct to the SEC. Eterna responded to the demand letter and produced certain information to Emerald in connection with the demand, which is subject to the terms of a confidentiality agreement entered into among the parties, including certain additional stockholders who subsequently joined as parties to such agreement. Following discussions, with no admission of wrongdoing, the Company and the Emerald Plaintiffs entered into a confidential settlement agreement, pursuant to which the Company paid $1.2 million in 2022 in full settlement of all of the Emerald Plaintiffs' purported claims, including a release by the Emerald Plaintiffs in favor of the Company in respect of any and all such claims.

Licensing Agreements

Exclusive Factor License Agreement.

In April 2021, Eterna LLC and the Licensors entered into an exclusive license agreement (the ''Original Factor License Agreement'') pursuant to which Eterna LLC acquired an exclusive worldwide license to the Licensed Technology for use in the development of certain mRNA, gene-editing, and cellular therapies to be evaluated and developed for treating human diseases, including certain types of cancer, sickle cell disease, and beta thalassemia.

As a result of the Novellus Acquisition, the rights and obligations of Novellus Limited under the Novellus-Factor License Agreement pertaining to any and all licensed products from Factor Limited inured to Eterna. The Company's agreement with Factor Limited under the Original Factor License Agreement remained unchanged after the completion of the Novellus Acquisition.

In November 2022, the Company entered into the first amendment to the Original Factor License Agreement (the ''Amended Factor License Agreement''), pursuant to which, among other things, Factor Limited granted to Eterna LLC an exclusive, sublicensable license under the Factor Patents for the purpose of identifying and pursuing certain opportunities to grant to third parties sublicenses to the Factor Patents. The term of the Amended Factor License Agreement is five years from the effective date of this amendment and is extendable for an additional two and a half years if the Company receives at least $100 million from sublicenses granted by it with respect to the sublicensing opportunities contemplated by the Amended Factor License Agreement. Pursuant to the Amended Factor License Agreement, the Company will pay to Factor Limited 20% of any sublicense fees it receives under a sublicense during the first five years and 30% of any sublicense fees it receives during the potential additional two and a half years.

USF

Eterna LLC has license agreements with University of South Florida Research Association, Inc. (''USF''), granting Eterna LLC the right to sell, market, and distribute IRX-2, subject to a 7% royalty payable to USF based on a percentage of gross product sales. Under the license agreement with USF, Eterna LLC is obligated to repay patent prosecution expenses incurred by USF. To date, Eterna LLC has not recorded any product sales, or obligations related to USF patent prosecution expenses. The license agreement terminates upon the expiration of the IRX-2 patents.

Royalty Agreements

While the agreements described below remain in force, the Company currently does not have plans to further develop the IRX-2 product candidate.

Collaborator Royalty Agreement

Pursuant to a royalty agreement the Company assumed when it acquired the assets of IRX in November 2018, the Company will pay a former collaborator a royalty equal to 6% of any sales of IRX-2, for the period of time beginning with the first sale of IRX-2 through the later of (i) the twelfth anniversary of the first sale of IRX-2 or (ii) the expiration of the last IRX patent, or other exclusivity of IRX-2.

Royalty Agreement with certain former IRX Therapeutics Investors

Pursuant to a royalty agreement (the ''IRX Investor Royalty Agreement'') with certain former IRX investors the Company assumed when it acquired the assets of IRX in November 2018, when Eterna LLC becomes obligated to pay royalties to USF under the agreement described above under ''Licensing Agreements-USF,'' it will pay an additional royalty of 1% of gross sales to an entity organized by such former investors.

Investor Royalty Agreement

On March 22, 2021, Eterna LLC restated its royalty agreement with certain beneficial holders of Brooklyn ImmunoTherapeutics Investors GP LLC and Brooklyn ImmunoTherapeutics Investors LP, whereby such beneficial holders will continue to receive, on an annual basis, royalties in an aggregate amount equal to 4% of the net revenues of IRX-2, a cytokine-based therapy that was previously being developed by Eterna LLC to treat patients with cancer.

Retirement Savings Plan

The Company established a defined contribution plan, organized under Section 401(k) of the Internal Revenue Code, which allows employees to defer up to 90% of their pay on a pre-tax basis. As of December 31, 2022, the Company had not contributed a match to the employees' contribution. Beginning on January 1, 2023, the Company began matching employees' contributions at a rate of 100% of the first 3% of the employee's contribution and 50% of the next 2% of the employee's contribution, for a maximum Company match of 4%.

13) Basic and Diluted Loss per Common Share

Basic net loss per share is calculated by dividing net loss by the weighted-average number of common shares outstanding during the period. Diluted net loss per share is calculated by dividing net loss by the weighted-average number of common shares outstanding plus dilutive securities. Shares of common stock issuable upon exercise, conversion or vesting of stock options, RSUs, warrants and other convertible securities, including our outstanding Series A Convertible Preferred Stock, are considered potential common shares and are included in the calculation of diluted net loss per share using the treasury method when their effect is dilutive. Diluted net loss per share is the same as basic net loss per share for periods in which the effect of potentially dilutive shares of common stock is antidilutive. The following table presents the amount of warrants, stock options, convertible preferred stock and RSUs that were excluded from the computation of diluted net loss per common share for the years ended December 31, 2022 and 2021, as their effect was anti-dilutive (in thousands):

	Years ended December 31,	
	2022	2021
Warrants	4,713	—
Stock options	359	199
Preferred stock converted into common stock	7	2
RSUs	4	12
Total potential common shares excluded from computation	5,083	213

14) Stock-Based Compensation

Equity Incentive Plans

The Company's stock-based compensation plans consist of the Restated 2020 Equity Incentive Plan (the ''Restated 2020 Plan'') and the 2021 Inducement Equity Incentive Plan (the ''2021 Inducement Plan''). The Company's board of directors has designated its Compensation Committee as the administrator of the foregoing plans (the ''Plan Administrator''). Among other things, the Plan Administrator selects persons to receive awards and determines the number of shares subject to each award and the terms, conditions, performance measures, if any, and other provisions of the award.

The Restated 2020 Plan provides for (a) approximately 424,000 shares of common stock that can be issued under the Restated 2020 Plan and (b) an annual increase in the number of shares reserved for issuance on January 1 of each year from 2022 through 2031 equal to the lesser of (i) 5% of the number of shares of common stock outstanding on the immediately preceding December 31 and (ii) such smaller number of shares of common stock as may be determine by the board of directors (the ''Annual Evergreen Shares''). Based on the number of shares of

common stock outstanding on December 31, 2022, the maximum increase to the number of Annual Evergreen Shares of common stock that can be issued under the Restated 2020 Plan in 2023 is approximately 256,000 shares. As of December 31, 2022, there have been no Annual Evergreen Shares added to the Restated 2020 Plan.

Awards under the Restated 2020 Plan may be granted to officers, directors, employees and consultants of the Company. Stock options granted under the Restated 2020 Plan may either be incentive stock options or nonqualified stock options, may have a term of up to ten years, and are exercisable at a price per share not less than the fair market value on the date of grant. As of December 31, 2022, there was approximately 166,000 shares of common stock remaining to be issued under the Restated 2020 Plan. As of December 31, 2021, there were approximately 258,000 stock options outstanding under the Restated 2020 Plan. There were no RSUs outstanding under the Restated 2020 Plan as of December 31, 2022.

The 2021 Inducement Plan provides for the grant of up to 75,000 share-based awards as material inducement awards to new employees in accordance with the employment inducement grant rules set forth in Section 711(a) of the NYSE American LLC Company Guide. The 2021 Inducement Plan expires in May 2031. As of December 31, 2022, there was approximately 57,000 shares of common stock remaining to be issued under the Restated 2020 Plan. As of December 31, 2021, there were approximately 12,000 stock options outstanding and approximately 4,000 RSUs outstanding under the Restated 2020 Plan.

Equity Awards

Stock Options

The Company records stock-based compensation in accordance with ASC Topic 718, Compensation – Stock Compensation. The Company estimates the fair value of stock options using the Black-Scholes option pricing model. The fair value of stock options granted is recognized as expense over the requisite service period on a straight-lined basis.

The risk-free rate is based on the observed interest rates appropriate for the expected life. The expected life (estimated period of time outstanding) of the stock options granted is estimated using the ‘‘simplified’’ method as permitted by the SEC’s Staff Accounting Bulletin No. 110, *Share-Based Payment*. Expected volatility is based on the volatility of the Company’s peer group over the expected life of the stock option granted, and the Company assumes no dividends. Forfeitures are recognized as incurred.

The following weighted-average assumptions were used for stock options granted during the years ended December 31, 2022 and 2021:

	Year ended December 31,	
	2022	2021
Weighted average risk-free rate	2.52%	1.09%
Weighted average volatility	90.49%	134.64%
Dividend yield	0%	0%
Expected term	5.79 years	6.10 years

The following table summarizes stock option activity for the years ended December 31, 2022 and 2021 (in thousands except for per-share and remaining contractual life data):

	Outstanding Options	Weighted Average Exercise Price per Share	Weighted Average Remaining Contractual Life (in years)	Aggregate Intrinsic Value
Outstanding January 1, 2021	—	$ —	—	$—
Granted	199	168.04		
Cancelled	—	—		
Outstanding December 31, 2021	199	$168.04	9.38	$—
Granted	287	17.29		
Cancelled	(127)	140.56		
Outstanding December 31, 2022	359	$ 57.18	7.57	$—
Options vested and exercisable at December 31, 2022	146	$109.60	4.79	$—

The per-share weighted average grant-date fair value of stock options granted during the year ended December 31, 2022 and 2021 was $12.91 and $151.40, respectively.

Pursuant to a separation agreement entered into in May 2022 with the Company's former chief executive officer, Dr. Howard Federoff, the Company accelerated the vesting of approximately 40,000 stock options under certain time-based vesting stock option grants previously awarded to Dr. Federoff. The Company also waived a performance condition under a performance-based stock option grant and accelerated the vesting of approximately 21,000 stock options under such grant. Lastly, the Company extended the post-termination exercise period from 90 days to 36 months immediately following his separation date for any options that were vested, including the options that accelerating in vesting, as described above.

The above modifications to Dr. Federoff's stock options grants resulted in modification accounting under ASC 718, *Compensation – Stock Compensation*. As a result, the Company immediately recognized approximately $0.1 million during 2022 for the incremental fair value of stock options that were vested prior to the modification by calculating the difference between the fair value of the modified award and the fair value of the original award immediately before it was modified. For stock options that were not vested prior to the modification but then vested as a result of the acceleration, the Company reversed any stock compensation expense previously recognized, remeasured the fair value of the modified award and immediately recognized approximately $0.1 million during 2022 of stock compensation expense in full since there was no future service period required to be provided.

As of December 31, 2022, the unamortized stock-based compensation expense related to outstanding unvested options was approximately $3.2 million with a weighted average remaining requisite service period of 2.70 years. The Company expects to amortize this expense over the remaining requisite service period of these stock options.

Vesting of all stock options grants is subject to continuous service with the Company through such vesting dates.

Restricted Stock Units

The following table summarizes RSU activity for the years ended December 31, 2022 and 2021 (in thousands except for per-share data):

	Outstanding Restricted Stock Units	Weighted Average Fair Value per Share
January 1, 2021	—	$ —
Granted	12	276.00
December 31, 2021	12	276.00
Granted	55	38.60
Released	(3)	271.42
Cancelled	(60)	61.03
December 31, 2022	4	$236.36
Balance expected to vest at December 31, 2022	4	

The Company recognizes the fair value of RSUs granted as expense on a straight-line basis over the requisite service period. For performance based RSUs, the Company begins recognizing the expense once the achievement of the related performance goal is determined to be probable.

Outstanding RSUs are settled in an equal number of shares of common stock on the vesting date of the award. An RSU award is settled only to the extent vested. Vesting generally requires the continued employment or service by the award recipient through the respective vesting date. Because RSUs are settled in an equal number of shares of common stock without any offsetting payment by the recipient, the measurement of cost is based on the quoted market price of the stock at the measurement date, which is the grant date.

In lieu of paying cash to satisfy withholding taxes due upon the settlement of vested RSUs, at the Company's discretion, an employee may elect to have shares of common stock withheld that would otherwise be issued at settlement, the value of which is equal to the amount of withholding taxes payable. There were no RSUs that vested during the year ended December 31, 2021. The following table shows the number of RSUs that vested and were settled during the year ended December 31, 2022, as well as the number of shares of common stock withheld to cover the withholding taxes and the net shares issued upon settlement (in thousands):

	Year ended December 31, 2022
RSUs vested	3
Common stock withheld to cover taxes	(1)
Common stock issued	2

Restricted Stock

Pursuant to the Merger, Eterna LLC's approximately 3,000 outstanding restricted common units were exchanged for approximately 32,000 shares of Eterna's restricted common stock. There were no changes to any conditions and requirements of the restricted common stock. The shares vested quarterly beginning on March 31, 2021 and were to continue through December 31, 2022, contingent on continued service. Due to the modification of the restricted common units, the fair value of the restricted common stock immediately after the Merger was compared to the fair value of the restricted common units immediately prior to the Merger, and the change in fair value of $0.3 million was recognized in the statement of operations during the year ended December 31, 2021. The Company recognizes the fair value of restricted common stock as an expense on a straight-line basis over the requisite service period. During the year ended December 31, 2022, approximately 4,000 shares of unvested restricted common stock were forfeited due to the holders of such shares no longer providing services to the Company. As of December 31, 2022 there were no shares of unvested restricted stock outstanding.

Stock-Based Compensation Expense

For the years ended December 31, 2022 and 2021, the Company recognized stock-based compensation expense as follows (in thousands):

	Years ended December 31,	
	2022	2021
Research and development	$1,249	$1,597
General and administrative	1,686	3,638
Total	$2,935	$5,235

15) Equity and Warrants

Private Placements of Equity

Q4-22 PIPE Transaction

On November 23, 2022, the Company entered into the Q4-22 Purchase Agreement with the Q4-22 PIPE Investors for the Q4-22 PIPE Transaction, pursuant to which the Company issued to the Q4-22 PIPE Investors an aggregate of approximately 2,185,000 units, with each unit consisting of (i) one share of common stock and (ii) two Q4-22 Warrants, each exercisable to purchase one share of common stock at an exercise price of $3.28 per, at a purchase price of $3.53 per unit (inclusive of $0.125 per Q4-22 Warrant). The Company received aggregate gross proceeds of approximately $7.7 million, and the Q4-22 PIPE Transaction closed on December 2, 2022. The Company incurred fees of approximately $0.3 million through December 31, 2022 related to the Q4-22 PIPE Transaction.

Each Q4-22 Warrant has an exercise price of $3.28 per share, becomes exercisable six months following the closing of the Q4-22 PIPE Transaction, expires five-and-one-half years from the date of issuance and is subject to customary adjustments. Certain of the Q4-22 Warrants may not be exercised if the aggregate number of shares of common stock beneficially owned by the holder thereof would exceed 4.99% immediately after exercise thereof, subject to increase to 9.99% at the option of the holder.

The Q4-22 Warrants meet the criteria for equity classification.

Q1-22 Private Placement

On March 6, 2022, the Company entered into the Q1-22 Purchase Agreement with the Q1-22 PIPE Investor for the Q1-22 PIPE Transaction, pursuant to which, the Company issued to the Q1-22 PIPE Investor approximately 343,000 units, each unit consisting of (i) one share of the Company's common stock (or, in lieu thereof, one Q1-22 Pre-Funded Warrant to purchase one share of common stock) and (ii) one warrant Q1-22 Common Warrant to purchase one share of common stock, for an aggregate gross purchase price of approximately $12.0 million (the ''Subscription Amount''). The Q1-22 PIPE Transaction closed on March 9, 2022. Pursuant to the Q1-22 Purchase Agreement, the Company was prohibited from issuing equity in variable rate transactions for a period of one-year following consummation of the Q1-22 PIPE Transaction, including issuing equity under the Second Purchase Agreement, which is discussed below.

Each Q1-22 Pre-Funded Warrant had an exercise price of $0.10 per share of common stock, was immediately exercisable, could be exercised at any time, had no expiration date and was subject to customary adjustments. The Q1-22 Pre-Funded Warrants could not be exercised if the aggregate number of shares of common stock beneficially owned by the holder thereof would exceed 9.99% immediately after exercise thereof. Upon the closing of the Q1-22 PIPE Transaction, the Company issued 275,000 shares of common stock, approximately 68,000 Q1-22 Pre-Funded Warrants and approximately 343,000 Q1-22 Common Warrants.

Each Q1-22 Common Warrant has an exercise price of $38.20 per share, became exercisable six months following the closing of the Q1-22 PIPE Transaction, expires five-and-one-half years from the date of issuance and is subject to customary adjustments. The Q1-22 Common Warrants may not be exercised if the aggregate number of shares of common stock beneficially owned by the holder thereof would exceed 4.99% immediately after exercise thereof, subject to increase to 9.99% at the option of the holder.

The Q1-22 Common Warrants and Q1-22 Pre-Funded Warrants were accounted for as liabilities under ASC 815-40, as these warrants provide for a cashless settlement provision that does not meet the requirements of the

indexation guidance under ASC 815-40. These warrant liabilities are measured at fair value at inception and on a recurring basis, with changes in fair value presented within the statement of operations. (See Note 5 for more information related to changes in fair value.) Upon exercise of the Q1-22 Common Warrants and Q1-22 Pre-Funded Warrants, the fair value on the exercise date is reclassified from warrant liabilities to equity.

The fair values of the Q1-22 Common Warrants and the Q1-22 Pre-Funded Warrants at the issuance date totaled $12.6 million in the aggregate, which was $0.6 million more than the Subscription Amount. The excess $0.6 million represents an inducement to the Q1-22 PIPE Investor to enter into the Q1-22 PIPE Transaction and was recorded in warrant liabilities expense in the accompanying consolidated statement of operations.

On July 12, 2022, the Q1-22 PIPE Investor exercised its 68,000 Q1-22 Pre-Funded Warrants at an exercise price of $0.10 per share for an aggregate exercise price of approximately $7,000, in cash. The Company issued 68,000 shares of common stock to the Q1-22 PIPE Investor on July 14, 2022 upon receipt of the cash proceeds and reclassified approximately $0.7 million of the fair value of the exercised warrants as of the exercise date from warrant liabilities to equity. Subsequent to the exercise, no Q1-22 Pre-Funded Warrants remained outstanding.

The Company incurred fees of approximately $1.0 million through December 31, 2022 related to the Q1-22 PIPE Transaction, which were allocated to the fair value of the Q1-22 Warrants and the Q1-22 Pre-Funded Warrants and recorded in other expense, net on the accompanying consolidated statement of operations.

In connection with the Q1-22 PIPE Transaction, the Company and the Q1-22 PIPE Investor also entered into a registration rights agreement, dated March 6, 2022, pursuant to which the Company agreed to prepare and file a registration statement with the SEC no later than 15 days following the filing date of the Company's Annual Report on Form 10-K for the year ended December 31, 2021 (the ''2021 Annual Report'') to register the resale of the shares of common stock included in the Units and the shares of common stock issuable upon exercise of the Q1-22 Pre-Funded Warrants and the Q1-22 Common Warrants. The Company agreed to use its best efforts to have such registration statement declared effective as promptly as possible after the filing thereof, subject to certain specified penalties if timely effectiveness were not achieved. The Company filed the 2021 Annual Report on April 15, 2022 and the registration statement on April 29, 2022. The resale registration statement became effective on May 11, 2022.

Pursuant to the registration rights agreement, the Company is obligated to pay the Q1-22 PIPE Investor liquidated damages equal to 2% of the Subscription Amount per month, with a maximum aggregate payment of 12% of the Subscription Amount, in the event the PIPE Investor is not permitted to use the registration statement to resell the securities registered for resale thereunder for more than a specified period of time.

On May 24, 2022, the Company notified the Q1-22 PIPE Investor that it was not able to use the registration agreement because the Company had not timely filed its Quarterly Report on Form 10-Q (the ''Q1 2022 10-Q'') with the SEC, and that the Q1-22 PIPE Investor could not use the registration statement to resell the securities registered thereunder until the Company filed the Q1 2022 10-Q. Because of the Q1-22 PIPE Investor's inability to use the registration statement, the Company accrued $0.2 million during 2022 for the contingent loss the Company incurred as liquidated damages as a result of the late Q1 2022 10Q filing, which is recorded in other expense, net for the year ended December 31, 2022 in the accompanying consolidated statements of operations. The Company paid such $0.2 million liquidated damages payment in June 2022.

On June 30, 2022, the Company filed its Q1 2022 10-Q along with an amended Annual Report on Form 10-K/A for the year ended December 31, 2021, and on July 1, 2022, the Company provided its notice to the Q1-22 PIPE Investor that it could resume use of the resale registration statement.

The following table shows the Company's warrant activity for the year ended December 31, 2022 (in thousands except for per-share data):

	March 2022 Warrants	Pre-Funded Warrants	November 2022 Warrants	Total Warrants
Balance as of January 1, 2022	—	—	—	—
Granted	343	68	4,370	4,781
Exercised	—	(68)	—	(68)
Balance as of December 31, 2022	343	—	4,370	4,713

As of December 31, 2022, the weighted average remaining contractual life of the warrants outstanding was 5.37 years and the weighted average exercise price was $5.82.

Equity Line Offerings

On April 26, 2021, the Company entered into a common stock purchase agreement (the ''First Purchase Agreement'') an investment group (the ''Investment Group''), which provided that the Company could offer to the Investment Group up to an aggregate of $20 million of common stock over a 36-month period commencing after May 10, 2021, the date that a registration statement covering the resale of shares of common stock issued under the First Purchase Agreement was declared effective by the SEC. As of December 31, 2022, the Company had issued and sold an aggregate of approximately 56,000 shares of common stock to the Investment Group pursuant to the First Purchase Agreement, resulting in gross proceeds of $20 million.

On May 26, 2021, the Company entered into a second common stock purchase agreement (the ''Second Purchase Agreement'') with the Investment Group, which provides that the Company may offer to the Investment Group up to an aggregate of $40 million of common stock over a 36-month period commencing after June 4, 2021, the date that a registration statement covering the resale of shares of common stock issued under the Second Purchase Agreement was declared effective by the SEC. As of December 31, 2022, the Company had issued and sold an aggregate of approximately 121,000 shares of common stock to the Investment Group pursuant to the Second Purchase Agreement, resulting in gross proceeds of approximately $34 million. As of December 31, 2022, there were approximately 22,000 shares remaining to be sold under the Second Purchase Agreement.

Under the Second Purchase Agreement, the Company may direct the Investment Group to purchase up to 3,000 shares of common stock on any business day (the ''Regular Purchase''), which amount may be increased up to 6,000 shares based on the closing price of the common stock, provided that the Investment Group's maximum commitment in any single Regular Purchase may not exceed $2.0 million. The purchase price per share for each such Regular Purchase is based off of the common stock's market immediately preceding the time of sale.

The Second Purchase Agreement also prohibits the Company from directing the Investment Group to purchase any shares of common stock if those shares, when aggregated with all other shares of common stock then beneficially owned by the Investment Group and its affiliates, would result in the Investment Group and its affiliates having beneficial ownership, at any single point in time, of more than 4.99% of the then total outstanding shares of common stock. The Company has the right to terminate the Second Purchase Agreement at any time, at no cost or penalty.

Actual sales of shares of common stock to the Investment Group under the Second Purchase Agreement depend on a variety of factors to be determined by us from time to time, including, among others, market conditions, the trading price of the common stock and determinations by the Company as to the appropriate sources of funding for the Company and its operations.

Pursuant to the Q1-22 Purchase Agreement in respect of the Q1-22 PIPE Transaction, the Company was prohibited from issuing additional shares under the Second Purchase Agreement for a period of one-year immediately following the closing of the Q1-22 PIPE Transaction.

Merger

Under the terms of the Merger Agreement (see Notes 1 and 4), on March 25, 2021, the Company issued shares of common stock to the equity holders of Eterna LLC. The 87,000 Class A units of Eterna LLC were converted into approximately 1,114,000 shares of common stock; the 15,000,000 Class B units were converted into approximately 126,000 shares of common stock; the 10,000,000 Class C units were converted into approximately 84,000 shares of common stock; approximately 630,000 shares of common units were converted into approximately 31,000 shares of common stock, and 10,500,000 rights options were converted into approximately 591,000 shares of common stock. The Company also issued approximately 53,000 shares of common stock to the Financial Advisor pursuant to the Merger Agreement.

Acquisition

Under the terms of the Novellus Acquisition (see Notes 1 and 4), on July 16, 2021, the Company issued approximately 351,000 shares of common stock, of which approximately 182,000 shares are unrestricted and approximately 169,000 shares are subject to a three-year lockup agreement, provided that up to 75% of the shares of common stock subject to the lock-up agreement may be released from the lock-up restrictions earlier if the price of common stock on the principal market for the common stock exceeds specified thresholds.

Cumulative Convertible Preferred Stock

As a result of the Merger, the Company has authorized 156,000 shares of preferred stock, all of which is designated as Series A Cumulative Convertible Preferred Stock (the ''Series A Preferred Stock''), and all of which were issued and outstanding as of December 31, 2022.

The Series A Preferred Stock provides for a cumulative annual dividend of $0.10 per share, payable in semi-annual installments in June and December. Dividends may be paid in cash or with shares of common stock. The Company paid approximately $16,000 in cash for payment of dividends during the year ended December 31, 2022. The Company paid approximately $8,000 in cash and issued approximately 10 shares of common stock for payment of dividends during the year ended December 31, 2021.

The Series A Preferred Stock has no voting rights and has a $1.00 per share liquidation preference over common stock. The registered holder has the right at any time to convert shares of Series A Preferred Stock into that number of shares of common stock that equals the number of shares of Series A Preferred Stock that are surrendered for conversion divided by the conversion rate. At December 31, 2022, the conversion rate was 23.9988 and, based on that conversion rate, one share of Series A Convertible Preferred Stock would have converted into approximately 0.04 shares of common stock, and all the outstanding shares of the Series A Convertible Preferred Stock would have converted into approximately 6,000 shares of common stock in the aggregate. There were no conversions during the years ended December 31, 2022 and 2021. There is no mandatory conversion term, date or any redemption features associated with the Series A Preferred Stock. The conversion rate will adjust under the following circumstances:

1. If the Company (a) pays a dividend or makes a distribution in shares of its common stock, (b) subdivides its outstanding shares of common stock into a greater number of shares, (c) combines its outstanding shares of common stock into a smaller number of shares, or (d) issues by reclassification of its shares of common stock any shares of its common stock (other than a change in par value, or from par value to no par value, or from no par value to par value), then the conversion rate in effect immediately prior to the applicable event will be adjusted so that the holders of the Series A Convertible Preferred Stock will be entitled to receive the number of shares of common stock which they would have owned or have been entitled to receive immediately following the happening of the event, had the Series A Convertible Preferred Stock been converted immediately prior to the record or effective date of the applicable event.

2. If the outstanding shares of the Company's common stock are reclassified (other than a change in par value, or from par value to no par value, or from no par value to par value, or as a result of a subdivision, combination or stock dividend), or if the Company consolidates with or merge into another corporation and the Company is not the surviving entity, or if the Company sells all or substantially all of its property, assets, business and goodwill, then the holders of the Series A Convertible Preferred Stock will thereafter be entitled upon conversion to the kind and amount of shares of stock or other equity securities, or other property or assets which would have been receivable by such holders upon such reclassification, consolidation, merger or sale, if the Series A Convertible Preferred Stock had been converted immediately prior thereto.

3. If the Company issues common stock without consideration or for a consideration per share less than the then applicable Equivalent Preference Amount (as defined below), then the Equivalent Preference Amount will immediately be reduced to the amount determined by dividing (A) an amount equal to the sum of (1) the number of shares of common stock outstanding immediately prior to such issuance multiplied by the Equivalent Preference Amount in effect immediately prior to such issuance and (2) the consideration, if any, received by the Company upon such issuance, by (B) the total number of shares of common stock outstanding immediately after such issuance. The ''Equivalent Preference Amount'' is the value that results when the liquidation preference of one share of Series A Convertible Preferred Stock (which is $1.00) is multiplied by the conversion rate in effect at that time; thus the conversion rate applicable after the adjustment in the Equivalent Preference Amount as described herein will be the figure that results when the adjusted Equivalent Preference Amount is divided by the liquidation preference of one share of Series A Convertible Preferred Stock.

16) Income Taxes

Loss before income taxes consist of the following (in thousands):

	Years ended December 31,	
	2022	2021
(in thousands)		
Domestic	$(24,513)	$(122,476)
Foreign	(21)	(5)
Total loss before income taxes	$(24,534)	$(122,481)

For each of the years ended December 31, 2022 and 2021, current tax provisions and current deferred tax provisions were recorded as follows (in thousands):

	Years ended December 31,	
	2022	2021
Current Tax Provision		
Federal	$ —	$ —
State	4	5
Foreign	—	—
	4	5
Deferred Tax Provision		
Federal	(6,851)	(5,840)
State	(1,602)	(1,414)
Foreign	(187)	(1)
	(8,640)	(7,255)
Change in valuation allowance	8,681	7,314
Total tax provision for income taxes	$ 45	$ 64

Deferred tax assets and liabilities consist of the effects of temporary differences as shown in the table below (in thousands). Deferred tax assets have been fully reserved by a valuation allowance since it is more likely than not that such tax benefits will not be realized.

	As of December 31,	
	2022	2021
Deferred Tax Assets:		
Net operating losses	$ 9,382	$ 5,457
Foreign net operating losses	782	595
Stock compensation	2,173	1,312
In-process research and development	1,233	—
Capitalized rearch and development expenses	1,502	—
R&D credit carryforwards	517	288
Compensation accrual	81	30
ROU Liabilities	334	706
Other	549	—
Total gross deferred tax assets	16,553	8,388
Valuation allowance	(16,157)	(7,467)
Net deferred tax assets	396	921

	As of December 31,	
	2022	2021
Deferred Tax Liabilities:		
Fixed assets	(10)	(168)
ROU Assets	(291)	(666)
Intangibles - goodwill	(160)	(112)
Total deferred tax liabilities	(461)	(946)
Net deferred taxes	$ (65)	$ (25)

The reconciliation of computed expected income taxes to effective income taxes by applying the federal statutory rate of 21% is as follows:

	As of December 31,	
	2022	2021
Tax at federal income tax rate	21.00%	21.00%
State income tax, net of federal tax	6.52%	1.15%
Foreign tax differential	(0.01%)	0.00%
Non-deductible expenses/excludable items	6.09%	(16.30%)
Change in valuation allowance	(35.38%)	(5.97%)
Credits	0.98%	0.23%
Uncertain tax positions	(0.49%)	0.00%
Other	1.11%	(0.16%)
Provision for income taxes	(0.18%)	(0.05%)

The net increase in the total valuation allowance for the year ended December 31, 2022 was an increase of approximately $8.8 million. In assessing the realizability of deferred tax assets, management considers whether it is more likely than not that some portion or all of the deferred tax assets will not be realized. The ultimate realization of deferred tax assets is dependent upon the generation of future taxable income during periods in which those temporary difference become deductible. Management considered the scheduled reversal of deferred tax liabilities, projected future taxable income and planning strategies in making this assessment. Based on the level of historical operating results and projections for the taxable income for the future, management has determined that it is more likely than not that the deferred taxes assets will not be utilized. Accordingly, the Company has recorded a full valuation allowance. The net deferred tax liability represents an indefinite life intangible liability related to tax deductible goodwill, partially offset by an indefinite life deferred tax asset.

At December 31, 2022 and 2021, the Company has available net operating loss (“NOL”) carryforwards of approximately $35.6 million and $20.7 million for federal income tax purposes, respectively, of which approximately $35.6 million can be carried forward indefinitely. The Company has available $28.8 million and $20.7 million state NOLs for the years ended December 31, 2022 and 2021, respectively, which begin to expire in 2041. The Company also has foreign NOL carryforwards of approximately $6.3 million and $4.8 million for the years ended December 31, 2022 and 2021, respectively, which carry forward indefinitely. Section 382 of the Internal Revenue Code (“IRC”) imposes limits on the ability to use NOL carryforwards that existed prior to a change in control to offset future taxable income. Such limitations would reduce, potentially significantly, the gross deferred tax assets disclosed in the table above related to the NOL carryforwards. The Company continues to disclose the NOL carryforwards at their original amount in the table above as no potential limitation has been quantified. The Company has also established a full valuation allowance for all deferred tax assets, including the NOL carryforwards, since the Company could not conclude that it was more likely than not able to generate future taxable income to realize these assets.

At December 31, 2022 and 2021 the Company has federal and state income tax credit carryforwards of approximately $0.5 million and $0.3 million, respectively. The credits begin to expire in 2041.

In accordance with authoritative guidance, the impact of an uncertain income tax position on the income tax return must be recognized at the largest amount that is more-likely-than-not to be sustained upon audit by the relevant taxing authority. An uncertain income tax position will not be recognized if it has less than a 50% likelihood of being sustained. The following table summarizes amounts the Company recorded for uncertain tax positions as of December 31, 2022 and 2021 (in thousands):

	As of December 31,	
	2022	2021
Beginning balance of uncertain tax positions	$ —	$—
Additions based on current year's tax positions	45	—
Net changes based on prior year's tax positions	76	—
Ending balance of uncertain tax positions	$121	$—

It is reasonably possible that unrecognized tax benefits may increase or decrease within the next twelve months due to tax examination changes, expiration of statute of limitations, or changes in tax law. The Company does not anticipate any significant changes to unrecognized tax benefits over the next 12 months.

The Company recognizes interest and penalties related to unrecognized tax positions within the income tax expense line in the accompanying consolidated statements of operations. There were no accrued interest and penalties associated with uncertain tax positions as of December 31, 2022 or December 31, 2021.

The Company is subject to U.S. federal, state, and foreign income tax. The Company's income tax returns are subject to examination by the relevant taxing authorities. As of December 31, 2022, the 2019 – 2022 tax years remain subject to examination in the U.S. federal tax, various state, and foreign tax jurisdictions. The Company is not currently under examination by federal state, or foreign jurisdictions.

On August 16, 2022, the Inflation Reduction Act of 2022 (the ''IRA'') was enacted into law. Among other changes to the tax code, the IRA imposes a 1% excise tax on certain repurchases of corporate stock by certain publicly traded corporations. The 1% stock buyback tax applies to redemptions by domestic corporations occurring in taxable years beginning after December 31, 2022. A number of exceptions to the stock buyback tax are available including exceptions to certain reorganizations. However, while these exceptions may be helpful in limiting the application of the stock buyback tax in situations in which it was not intended to apply, more guidance will be necessary for taxpayers to analyze the potential application of these exceptions and whether they will be able to rely upon them.

17) Subsequent Event

Cell Customization and License Agreement

On February 21, 2023, the Company and Lineage Cell Therapeutics, Inc. (''Lineage'') entered into an exclusive option and license agreement (the ''Lineage Agreement''), pursuant to which, Lineage may request prior to August 22, 2023 that the Company develops for, and delivers to, Lineage certain induced pluripotent stem cell lines, which Lineage would use to evaluate the possible development of cell transplant therapies for treatment of diseases of the central nervous system in humans, excluding ophthalmologic indications, (b) diseases and conditions of the peripheral nervous system, (c) psychiatric, respiratory, musculoskeletal, and hematological diseases, disorders, and conditions, and (d) cancer. The Lineage Agreement also provides Lineage with the option to obtain an exclusive sublicense to certain related technology for preclinical, clinical and commercial purposes, which would permit Lineage to sublicense such intellectual property, subject to payment of certain sublicense royalty fees. Lineage has six months from our delivery to Lineage of such induced pluripotent stem cell lines to exercise such option, and upon any such exercise, Lineage would agree to use its commercially reasonable efforts to exploit and make commercially available one or more licensed products derived from such induced pluripotent stem cell lines in accordance with the Lineage Agreement. Upon entry into the Lineage Agreement, Lineage paid the Company a $250,000 non-refundable up-front payment. We are also entitled to certain cell line customization fees with respect to cell lines that Lineage may request that we develop for Lineage, and royalty payments with respect to any such licensed products, certain sublicense fees and certain milestone payments under the Lineage Agreements.

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