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

FORM 10-K

☒ ANNUAL REPORT PURSUANT TO SECTION 13 OR 15 (d) OF THE SECURITIES EXCHANGE ACT OF 1934
For the Fiscal Year Ended: December 31, 2022

☐ 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: 000-16375

ThermoGenesis Holdings, Inc.
(Exact name of registrant as specified in its charter)

Delaware	**94-3018487**
(State of incorporation)	(I.R.S. Employer Identification No.)

2711 Citrus Road
Rancho Cordova, California 95742
(Address of principal executive offices) (Zip Code)

(916) 858-5100
(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, $.001 par value	THMO	Nasdaq Capital Market

Securities Registered Pursuant to Section 12(g) of the Act: None

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

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

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

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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 definition 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 Exchange Act).

Yes ☐ No ☒

As of June 30, 2022, the aggregate market value of the common equity held by non-affiliates of the registrant was approximately $4,277,535 based on the closing sales price as reported on the Nasdaq Stock Market.

Class	Outstanding at March 27, 2023
Common stock, $.001 par value	1,535,869

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Cautionary Statement Regarding Forward Looking Statements

This Annual Report contains forward-looking statements within the meaning of the "safe harbor" provisions of the Private Securities Litigation Reform Act of 1995. All statements, other than statements of historical fact included in this Annual Report, are forward-looking statements. Reference is made in particular to the description of our plans and objectives for future operations, assumptions underlying such plans and objectives, and other forward-looking statements included in this Annual Report. Such statements may be identified by the use of forward-looking terminology such as "may," "will," "expect," "believe," "estimate," "anticipate," "intend," "continue," "plan," "predict," "seek," "should," "would," "could," "potential," "ongoing," or similar terms, variations of such terms, or the negative of such terms, and include, but are not limited to, statements regarding projected results of operations, capital expenditures, earnings, management's future strategic plans, development of new technologies and services, litigation, regulatory matters, market acceptance and performance of our services, the success and effectiveness of our technologies and services, our ability to retain and hire key personnel, the competitive nature of and anticipated growth in our markets, market position of our services, marketing efforts and partnerships, liquidity and capital resources, our accounting estimates, and our assumptions and judgments. Such statements are based on management's current expectations, estimates and projections about our industry, management's beliefs, and certain assumptions made by us, all of which are subject to change.

These forward-looking statements are not guarantees of future results and are subject to a number of risks, uncertainties and assumptions that are difficult to predict and that could cause actual results to differ materially and adversely from those described in the forward-looking statements, including:

- the sufficiency and source of capital required to fund our operations and in furtherance of our business plan;
- our ability to remain listed on Nasdaq Capital Market and remain in compliance with its listing standards;
- the global perception of the clinical utility of banked cord blood and the amount of investment in research and development supporting clinical data for additional applications;
- the success of any collaborative arrangements to commercialize our products;
- our reliance on significant distributors or end users;
- the availability and sufficiency of commercial scale manufacturing facilities and reliance on third-party contract manufacturers;
- risks associated with launching our planned CDMO business;
- our ability to protect our patents and trademarks in the U.S. and other countries; and
- uncertainty regarding the impact of the COVID-19 pandemic on our business and operations.

These forward-looking statements speak only as of the date of this Annual Report and we expressly disclaim any obligation or undertaking to release publicly any updates or revisions to any forward-looking statements contained herein to reflect any change in the expectations with regard thereto or any change in events, conditions, or circumstances on which any such statement is based, except as otherwise required by law. Additional factors that could cause such results to differ materially from those described in the forward-looking statements are set forth in connection with the forward-looking statements.

Trademarks

This Annual Report contains references to our trademarks and to trademarks belonging to other entities. Solely for convenience, trademarks and trade names referred to in this Annual Report, including logos, artwork and other visual displays, may appear without the ® or TM symbols, but such references are not intended to indicate, in any way, that their respective owners will not assert, to the fullest extent under applicable law, their rights thereto. We do not intend our use or display of other companies' trade names or trademarks to imply a relationship with, or endorsement or sponsorship of us by, any other companies.

Reverse Stock Split

On December 22, 2022, we effected a one (1) for forty-five (45) reverse stock split of our issued and outstanding common stock. All historical share amounts disclosed in this Annual Report on Form 10-K have been retroactively restated to reflect the reverse split and subsequent share exchange. No fractional shares were issued as a result of the reverse stock split, as fractional shares of common stock were rounded up to the nearest whole share.

PART I

ITEM 1. Business

Overview

ThermoGenesis Holdings, Inc. ("ThermoGenesis Holdings," the "Company," "we," "our," "us") develops and commercializes a range of automated technologies for cell-banking, cell-processing, and cell-based therapeutics. Since the 1990's, ThermoGenesis Holdings has been a pioneer in, and a leading provider of automated systems that isolate, purify and cryogenically store units of hematopoietic stem and progenitor cells for the cord blood banking industry. The Company was founded in 1986 and is incorporated in the State of Delaware and headquartered in Rancho Cordova, CA.

Medical Device Products for Automated Cell Processing

The Company provides the AutoXpress® and BioArchive® platforms for automated clinical bio-banking, PXP® platform for point-of-care cell-based therapies and the CAR-TXpress™ platform for large scale cell manufacturing services. All product lines are reporting as a single reporting segment in the financial statements.

Clinical Bio-Banking Applications:

- AXP® Automated Cell Separation System – an automated, fully closed cell separation system for isolating stem and progenitor cells from umbilical cord blood, registered as a U.S. FDA 510(k) medical device.
- BioArchive® Automated Cryopreservation System – an automated, robotic, liquid nitrogen controlled-rate-freezing and cryogenic storage system for cord blood samples and cell therapeutic products used in clinical applications, registered as a U.S. FDA 510(k) medical device.

Point-of-Care Applications:

- PXP® Point-of-Care System – an automated, fully closed, sterile system allows for the rapid, automated processing of autologous peripheral blood or bone marrow aspirate derived stem cells at the point-of-care, such as surgical centers or clinics, registered as a U.S. FDA 510(k) medical device.
- PXP-LAVARE System – an automated, fully closed system that is designed to wash, re-suspend and volume reduce cell suspensions. It allows for volume manipulation, supernatant or media exchange, and cell washing to occur without comprising cell viabilities and maximizing recoveries, registered as a U.S. FDA 510(k) medical device.
- PXP-1000 System – an automated, fully closed system that provides fast, reproducible separation of multiple cellular components from blood with minimal red blood cell contamination, registered as a U.S. FDA 510(k) medical device.

Large Scale Cell Processing and Biomanufacturing:

- X-Series® Products for general laboratory use: X-Lab® for cell isolation, X-Wash® System for cell washing and reformulation, X-Mini® for high efficiency small scale cell purification, and X-BACS® System under development for large scale cell purification using our proprietary Buoyancy-Activated Cell Sorting ("BACS") technology.
- CAR-TXpress™ Platform for Clinical Manufacturing – a modular designed, functionally closed manufacturing platform that addresses the critical unmet need for large scale cellular processing and chemistry, manufacturing and controls ("CMC") needs for manufacturing cellular therapies, including CAR-T cell therapies.

Contract Development and Manufacturing Services for Cell and Cell-Based Gene Therapies

The Company plans to expand its business to include contract development and manufacturing services for cell and cell-based gene therapies. The Company is in the process building out the capabilities to become a world-class Contract Development and Manufacturing Organization ("CDMO") for cell and cell-based gene therapies by partnering with Boyalife Genomics Tianjin Ltd., a China-based CDMO organization ("Boyalife Genomics"), to in-license certain know-how and other intellectual property from Boyalife Genomics. The Company is rolling out a new facility in the Sacramento metro area, containing a total of 12, class-7, ReadyStart cGMP Suites available for lease by early-stage life science and cell gene therapy ("CGT") companies. The ReadyStart Suites are located in a 35,500+ square foot cGMP facility that will meet the highest scientific, quality, and regulatory requirements. We intend to leverage our existing technology and combine it with the in-licensed technologies to develop a proprietary manufacturing platform for cell manufacturing activities.

The Company plans to develop and operate its planned CDMO business through a division named TG Biosynthesis™. It is anticipated that TG Biosynthesis will provide high-quality development and manufacturing capabilities, cell and tissue processing development, quality systems, regulatory compliance, and other cell manufacturing solutions for clients with therapeutic candidates in various stages of development.

The Company believes that CDMO cell manufacturing services are becoming increasingly important for cell therapies to make their way through clinical trials. One of the major issues with moving cell therapy products from "bench to bedside" has been manufacturing bottlenecks. The heterogeneous nature of cell therapy products has introduced manufacturing complexity and regulatory concerns, as well as scale-up complexities that are not present within traditional pharmaceutical manufacturing. Additionally, establishing a manufacturing facility for cell therapies requires specific expertise and significant capital which can delay clinical trials. These factors often result in a significant number of cell therapy-based companies seeking CDMOs for their cell manufacturing needs. The Company believes that it can leverage its current proprietary automated and semi-automated cell processing technologies to more effectively develop CDMO capabilities.

In furtherance of our planned CDMO business, on March 24, 2022, we entered into a License and Technology Access Agreement with Boyalife Genomics (the "Boyalife License Agreement"). Boyalife Genomics is an affiliate of our Chairman and CEO, Dr. Chris Xu, and is a Tianjin, China-based cell manufacturing organization that has developed substantial manufacturing technology relating to cell manufacturing services. Under the terms of the Boyalife License Agreement, Boyalife Genomics granted the Company and its subsidiaries and affiliates a perpetual exclusive license in the United States to use Boyalife Genomics' existing and future know-how and U.S. patents rights (if any) relating to cell manufacturing and related processes, including the right to sublicense such know-how and patent rights to affiliates of the Company. Notwithstanding the foregoing exclusivity, Boyalife Genomics retains the right to use (but not license) the licensed intellectual property in the U.S. for its internal use in connection with the provision of products and services to third parties. In consideration of this license, the Company will, among other things, pay to Boyalife Genomics a running royalty of 7.5% of the Company's annual net sales of products and services that are covered by one of more Boyalife Genomics' granted U.S. patents and 5.0% of other products and services covered by the licensed intellectual property. The royalty will be payable on each licensed product or service for a period of 10 years from the first commercial sale of the product or service (or if patented, until the expiration of the applicable licensed patents), and the license will be royalty-free thereafter on such licensed product or service. The agreement also grants the Company a right of first refusal to purchase any cell manufacturing business or operation of Boyalife Genomics upon the same terms as any third-party offer to buy such business or operation.

The successful development and launch of TG Biosynthesis will require us to raise additional capital, acquire various equipment for the planned operations, hire certain personnel needed to launch the operation, and timely complete the build-out of our leased Sacramento facility. There is no assurance that we will be able to successfully obtain such additional capital resources, as such capital may not be available on reasonable terms, or available at all. We will need to hire, train, and retain additional employees who have experience in the cell manufacturing field in order for our CDMO business to be successful. We expect the CDMO facility to be completed in 2023.

Sales and Distribution Channels

We market and sell our medical device products through independent distributors, except in North America and India, where we sell direct to end-user customers.

Research and Development

Research and development expenses related to our medical device products were $1,659,000 and $2,209,000 for the years ended December 31, 2022 and 2021, respectively. Research and development activities include expenses associated with the engineering, regulatory, and scientific affairs functions.

We have not to date incurred any material research and development expenses related to our planned CDMO business.

Manufacturing and Raw Materials

We source components for our medical device products from multiple suppliers that manufacture to our engineering specifications. Our high-volume AXP disposable products are manufactured using contract manufacturers. We utilize our manufacturing facility and in-house clean room in Rancho Cordova, California for production of our higher complexity devices and X-Series disposable cartridges. Various raw materials are used to manufacture our products. The raw materials are generally available from multiple sources. We have not had significant difficulty obtaining necessary raw materials.

Quality System

Our quality system for our medical device products business is compliant with domestic and international standards and is appropriate for the specific devices we manufacture. Our corporate quality policies govern the methods used in, and the facilities and controls used for, the design, manufacture, packaging, labeling, storage, installation, and servicing of all finished devices intended for human use. Such policies are intended to ensure that the products we market are safe, effective, and otherwise in compliance with the FDA Quality System Regulation (“QSR”) (21 C.F.R. Part 820), EN ISO 13485: 2016 standard, the European Union Medical Device Regulations (EU MDR 2017/745), the Canadian Medical Device Regulations (SOR 98-282), the Brazil ANVISA RDC 16/2013, UK MDR and/or other applicable local, state, national and international regulations.

The Company and its contract manufacturers are subject to inspections by the FDA and other regulatory agencies to ensure compliance with the FDA's QSRs. Compliance requirements relate to manufacturing processes, product testing, documentation control and other quality assurance procedures. Our facilities have undergone International Organization of Standards ("ISO") 13485:2016 and EU Medical Device Directive ("MDD") (93/42/EEC) inspections and we have obtained approval to CE-Mark our products. We have received our updated certificate demonstrating compliance to this standard under the Medical Device Single Audit Program ("MDSAP").

Regulatory Scheme and Strategy

The development, manufacture and marketing of our medical device products are subject to regulation by the FDA as well as the equivalent agencies of other countries including the countries of the European Union and India.

We have a quality and regulatory compliance management system that meets the requirements of the ISO 13485: 2003 standard, the FDA's QSRs, the EU MDD, Canadian Medical Device Regulations (SOR 98-282), and all other applicable local, state, national and international regulations.

The FDA regulates medical devices to ensure their safety and efficacy under the Federal Food Drug and Cosmetic Act ("FD&C"). Medical devices are defined by language within the FD&C Act which essentially states that a product is considered a medical device if it is intended to provide a diagnosis or basis for treatment. Once a company determines that its product is a medical device, it is required to comply with a number of federal regulations. These include the following:

- 510(k) clearance or Premarket Approval Application ("PMA") approval from the FDA, prior to commercialization (unless the device is classified as "exempt");
- Registration of the company and listing of the medical device with the FDA (within 30 days prior to commercialization);
- Establishment and adherence to the FDA's labeling requirements; and
- Establishment and adherence to the FDA's Quality Systems and Medical Device Reporting regulations.

The FDA classifies medical devices into three groups: Class I, II or III. These are stratified from lowest to highest safety risk, and regulatory controls increase based on Class.

Class I Devices
Some of our products are considered to pose little or no risk when used as directed and have been deemed by the FDA to be "exempt" from FDA approval or clearance processes prior to commercialization. While pre-marketing FDA review is not mandatory for Exempt Class I medical devices, the manufacturer's compliance with QSR is required.

Class II Devices
Several of our products, including the BioArchive and the AXP II are categorized as U.S. Class II medical devices and require premarket notification, also known as a section 510(k) clearance, prior to commercialization. Data submitted as part of a 510(k) process must demonstrate a device is "substantially equivalent" with a predicate device that is already on the market. Once 510(k) clearance has been secured, the new medical device may be marketed for its intended use and distributed in the U.S.

Class III Devices

If a product is considered a Class III device, the FDA approval process is more stringent and time-consuming, and includes the following:

- Extensive pre-clinical laboratory and animal testing;
- Submission and approval of an Investigational Device Exemption ("IDE") application prior to the conduct of a clinical study;
- Human clinical studies (or trials) to establish the safety and efficacy of the medical device for the intended use; and
- Submission and approval of a PMA application to the FDA.

Pre-clinical testing typically involves in vitro laboratory analysis and in vivo animal studies to obtain information related to such things as product safety, feasibility, biological activity and reproducibility. The results of pre-clinical studies are submitted to the FDA as part of an IDE application and are reviewed by the Agency before human clinical trials can begin.

Higher risk clinical trials conducted inside the U.S. are subject to FDA IDE regulation (21 C.F.R. Part 812), or an Investigational New Drug ("IND") application (21 C.F.R. Part 312). Clinical trials conducted outside the U.S., and the data collected therefrom are allowed in accordance with applicable FDA requirements. The FDA or the sponsor may suspend a clinical trial at any time if either one believes that study participants may be exposed to an unacceptable health risk.

For certain Class III devices, data generated during product development, pre-clinical studies, and human clinical studies must be submitted to the FDA as a PMA application in order to secure approval for commercialization in the U.S. The FDA may deny the approval of a PMA application if applicable regulatory criteria are not satisfied and, in some cases, may mandate additional clinical testing. Product approvals, once obtained, can be withdrawn if compliance with regulatory standards is not maintained or if safety concerns arise after the product reaches the market. The FDA might also require post-marketing testing and surveillance programs to monitor the safety and efficacy of a medical device and has the power to forbid or limit future marketing of the product based on the results of such programs.

Other U.S. Regulatory Information

Medical device manufacturers must register with the FDA and submit their manufacturing facilities to biennial inspections to ensure compliance with applicable regulations. Failure to comply with FDA requirements can result in withdrawal of marketing clearances, fines, injunctions, civil penalties, recall or seizure of products, total or partial suspension of production or loss of distribution rights. In addition, device manufacturing facilities in the state of California must be registered with the California State Food and Drug Branch of the California Department of Public Health and submit to an annual inspection by the State of California to ensure compliance with applicable state regulations. We are also subject to a variety of environmental laws as well as workplace safety, hazardous material, and controlled substances regulations.

Also, federal transparency requirements, sometimes referred to as the "Sunshine Act" under the Patient Protection and Affordable Care Act, require manufacturers of drugs, devices, biologics and medical supplies that are reimbursable under Medicare, Medicaid, or the Children's Health Insurance Program to report to the Department of Health and Human Services information related to physician payments and other transfers of value and physician ownership and investment interests.

Changes in these laws at all levels of government are frequent and could increase our cost of doing business. If we fail to comply, even inadvertently, with any of these requirements, we could be required to alter our operations, refund payments to the government, lose our licensure or accreditation, enter into corporate integrity, deferred prosecution or similar agreements with state or federal government agencies, and become subject to significant civil and criminal penalties.

International Regulatory Requirements

International regulatory requirements differ somewhat from those of the U.S. In the European Union ("EU"), a single regulatory approval process has been created and approval is represented by CE-Marking. To be able to affix the CE-Mark to our medical devices and distribute them in the EU, we must meet minimum standards for safety and quality (known as the essential requirements) and comply with one or more conformity rules. A notified body assesses our quality management system and compliance with the Medical Device Directive. Marketing authorization can be revoked by the applicable governmental agency or notified body in the event of an unsuccessful quality system annual audit.

In India, the regulatory body having oversight of medical devices, therapies, and cell banking is the Central Drugs Standard Control Organization ("CDSCO"), and specifically the Drugs Controller General India office. Our marketing and facilities licenses are subject to revocation by the applicable state Drug Controller in Haryana or DCGI.

Patents and Proprietary Rights

We believe that patent protection is important for our products and current and proposed business. We currently have over 28 issued patents globally relating to our medical devices that will expire at various times between March 2031 and May 2040. The patent positions can be uncertain because they involve interpretation of complex factual information and an evolving legal environment. The coverage sought in a patent application can be denied or significantly reduced either before or after the patent is issued. There can be no assurance that any of our pending patent applications will actually result in an issued patent. Furthermore, there can be no assurance that any existing or future patent will provide significant protection or commercial advantage, or that any existing or future patent will not be circumvented by a more basic patent. Generally, patent applications can be maintained in secrecy for at least 18 months after their earliest priority date. In addition, publication of discoveries in the scientific or patent literature often lags behind actual discoveries. Therefore, we cannot be certain that we were the first to invent or the first to file a patent application for the subject matter covered by each of our pending U.S. and foreign patent applications.

If a third party files a patent application relating to an invention claimed in our patent application, we may be required to participate in an interference or derivation proceeding conducted by the U.S. Patent and Trademark Office to determine who owns the patent. Such proceeding could involve substantial uncertainties and cost, even if the eventual outcome is favorable to us. There can be no assurance that our patents, if issued, would be upheld as valid in court.

Intellectual property for our planned CDMO business, primarily in the form of know-how and proprietary trade information, will generally be licensed to us under the Boyalife License Agreement.

Material Agreements

The following are certain material agreements involving our business in effect as of December 31, 2022:

Corning Incorporated

On August 30, 2019, the Company entered into a Supply Agreement with Corning (the "Supply Agreement"). The Supply Agreement has an initial term of five years with automatic two-year renewal terms, unless terminated by either party in accordance with the terms of the Supply Agreement (collectively, the "Term"). Pursuant to the Supply Agreement, the Company has granted to Corning exclusive worldwide distribution rights for substantially all X-Series® products under the CAR-TXpress™ platform (the "Products") manufactured by its subsidiary, ThermoGenesis Corp., for the duration of the Term, subject to certain geographical and other exceptions. In addition, the Company has granted Corning rights of first refusal for the exclusive worldwide distribution of certain future products developed or introduced by the Company relating to cell isolation or cell selection, including any such products substantially related or similar to the Products (the "ROFR Products"). As consideration for the exclusive worldwide distribution rights for the Products and ROFR Products, Corning paid a $2,000,000 upfront fee, in addition to any amounts payable throughout the Term for the Products and any ROFR Products.

CBR Systems, Inc. ("CBR")

Manufacturing and Supply Agreement
Effective July 13, 2020, the Company entered a Manufacturing and Supply Amending Agreement #2 (the "Amendment") with CBR Systems, Inc. ("CBR"), an amendment to the Manufacturing Supply Amending Agreement #1 effective March 16, 2020 and the Manufacturing and Supply Agreement effective May 15, 2017 (the "CBR Agreement"), in which we agreed to supply CBR with AXP cord blood processing system and disposables. The term of the CBR Agreement is for three years and will automatically renew in one-year increments unless either party provides written notice of its intention not to renew six months prior to the end of the term. The Amendment, among other things, revised the amount of certain products to be purchased, pricing of those products and removal of the safety stock requirement.

Technology License and Escrow Agreement
As part of the Amendment, the Company updated the compliance conditions in the Technology License and Escrow Agreement (the "Escrow Agreement"), which was originally signed by the Company and CBR in June 2010. Under the Escrow Agreement, we granted CBR a perpetual, royalty-free license to certain intellectual property necessary for the manufacture of AXP® devices and disposables. The license is for the sole and limited purpose of ensuring continued supply of AXP devices and disposables for use by CBR. The licensed intellectual property is held in escrow and available to CBR only in the event of a default under the Escrow Agreement. The Escrow Agreement requires that our cash balance and short-term investments, net of non-convertible debt and borrowed funds that are payable within one year, is greater than $1,000,000 at the end of each month or we will be in default of the agreement. Upon a default, CBR may take possession of the escrowed intellectual property and initiate manufacturing of AXP device and disposables for their internal use. The Company was in compliance with the License and Escrow Agreement at December 31, 2022.

Employees

As of December 31, 2022, we and our subsidiaries had 41 employees consisting of 37 full-time U.S. employees, 1 part-time U.S. employee and 3 full-time employees in India. We also utilize temporary employees throughout the year to address business needs and significant fluctuations in orders and product manufacturing. None of our employees are covered by a collective bargaining agreement, nor have we experienced any work stoppage.

We endeavor to maintain workplaces that are free from discrimination or harassment on the basis of color, race, sex, national origin, ethnicity, religion, age, disability, sexual orientation, gender identification or expression or any other status protected by applicable law. The basis for recruitment, hiring, development, training, compensation and advancement is a person's qualifications, performance, skills and experience. We believe that our employees are fairly compensated, without regard to gender, race and ethnicity, and routinely recognized for outstanding performance.

Foreign Sales and Operations

See Note 12 of our Notes to Consolidated Financial Statements for information on our sales and operations outside of the U.S.

Where you can Find More Information

We are required to file annual reports on Form 10-K, quarterly reports on Form 10-Q, current reports on Form 8-K and other information, including our proxy statement, with the Securities and Exchange Commission ("SEC"). The public can obtain copies of these materials by accessing the SEC's website at http://www.sec.gov. In addition, as soon as reasonably practicable after these materials are filed with or furnished to the SEC, we will make copies available to the public free of charge through our website, http://www.thermogenesis.com. The information on our website is not incorporated into, and is not part of, this Annual Report on Form 10-K or our other filings with the SEC.

ITEM 1A. Risk Factors

An investment in our common stock is subject to risks inherent to our business. The material risks and uncertainties that management believes affect us are described below. Before making an investment decision, you should carefully consider the risks and uncertainties described below together with all of the other information included or incorporated by reference in this Annual Report. The risks and uncertainties described below are not the only ones we face. Additional risks and uncertainties that we are not aware of or focused on or that we currently deem immaterial may also impair our business operations. This Annual Report is qualified in its entirety by these risk factors.

If any of the following risks actually occur, our financial condition and results of operations could be materially and adversely affected. If this were to happen, the value of our common stock could decline significantly, and you could lose all or part of your investment.

Risks Related to Our Structure and Business

A third party owns 20% of our subsidiary, CARTXpress Bio, Inc. ("*CARTXpress Bio*"*), and holds certain minority investor rights therein.* These rights could limit or delay our ability to take certain major actions relating to CARTXpress Bio. In January 2019, ThermoGenesis Corp. contributed its X-Series business into a newly formed subsidiary of ThermoGenesis Corp., CARTXpress Bio. Pursuant to the terms of a reorganization and share exchange agreement, ThermoGenesis Holdings acquired a 20% equity ownership in ThermoGenesis Corp. from Bay City Capital Fund V, L.P. and certain of its affiliates ("Bay City"). In exchange, Bay City acquired a 20% ownership in CARTXpress Bio. As a result of these transactions, ThermoGenesis Corp. became a wholly-owned subsidiary of ThermoGenesis Holdings, and ThermoGenesis Corp. owns 80% of the outstanding equity of CARTXpress Bio, while Bay City owns the remaining 20% of the outstanding equity of CARTXpress Bio. While we continue to indirectly own 80% of the outstanding capital stock of CARTXpress Bio, Bay City was granted certain minority investor rights in CARTXpress Bio. These rights include board representation rights, a right of first refusal over sales of CARTXpress Bio. stock by us, co-sale rights with respect to any sale of CARTXpress Bio stock by us, certain piggyback and Form S-3 registration rights in the event that CARTXpress Bio becomes a publicly traded company at any time in the future and other rights as detailed in the Investors' Rights Agreement. In addition, the board of directors of CARTXpress Bio is comprised of three persons, two of whom are designated by us and one of whom is designated by Bay City. The foregoing minority investor rights in CARTXpress Bio could limit or delay our ability or flexibility to take certain major actions or make major decisions relating to CARTXpress Bio that might be beneficial to our stockholders, unless such actions or decisions have the consent or support of Bay City. Accordingly, the minority investor rights in CARTXpress Bio could have a negative impact on the market price of our common stock.

Our largest stockholder has significant influence over us which could limit your ability to influence the outcome of key transactions, including a change of control, and could negatively impact the market price of our common stock by discouraging third party investors. As of December 31, 2022, approximately 26% of our outstanding common stock is owned by Boyalife Group USA ("Boyalife"). In addition, pursuant to the terms of the Amended Nomination Agreement we entered into with Boyalife in April 2018, Boyalife has the right to designate a number of members of our board of directors that is in proportion to the "Boyalife Ownership Percentage", which is Boyalife and its affiliates' combined percentage ownership of outstanding common stock, treating as outstanding any shares of common stock underlying convertible securities that are immediately exercisable by Boyalife and its affiliates' (including under the debt facility) without any further payment. The Amended Nomination Agreement will terminate according to its terms when and if the Boyalife Ownership Percentage falls below 20%.

Boyalife is 100% owned by Dr. Xiaochun Xu, our Chief Executive Officer and Chairman of our Board of Directors. As a result of their ownership and ability to designate members of our Board of Directors, Boyalife (including Dr. Xu) is able to exercise significant influence over all matters affecting us, including the election of directors, formation and execution of business strategy and approval of mergers, acquisitions and other significant corporate transactions, which may have an adverse effect on our stock price and ability to execute our strategic initiatives. Boyalife and/or Dr. Xu may have conflicts of interest and interests that are not aligned with those of other investors in all respects. As a result of the concentrated ownership of our common stock, Dr. Xu may be able to control matters requiring stockholder approval, including the election of directors, the adoption of amendments to our certificate of incorporation and bylaws, and approval of a sale of our Company, and other significant corporate transactions. This concentration of ownership may delay or prevent a change in control and may have a negative impact on the market price of our common stock by discouraging third party investors from investing or making tender offers for our shares.

Boyalife is also a material creditor of our Company. We are a party to a revolving debt facility with Boyalife which has a maximum borrowing availability of $10,000,000 and an outstanding balance as of December 31, 2022 of $7,000,000 in principal and $1,492,000 in accrued interest. The debt facility, as amended, matures on December 31, 2023, with accrued interest due annually on the last day of each calendar year. Because this debt facility is secured by all of our shares in our ThermoGenesis Corp. subsidiary, an event of default under the debt facility would have a material adverse impact on our interest in ThermoGenesis Corp. if the lender under the debt facility elected to foreclose on such security interest.

In addition, we are also a party to a License and Technology Access Agreement and facility lease with affiliates of Dr. Xu and Boyalife upon which our planned CDMO business will be dependent.

We may seek to enter into collaborative arrangements to develop and commercialize products which may not be successful. We may seek to enter into collaborative arrangements to develop and commercialize some of our potential products and product candidates both in North America and international markets. There can be no assurance that we will be able to negotiate collaborative arrangements on favorable terms or at all or that current or future collaborative arrangements will be successful.

A significant portion of revenue is derived from customers outside the United States. We may lose revenues, market share, and profits due to exchange rate fluctuations and political and economic changes related to its foreign business. For the year ended December 31, 2022, sales to customers outside the U.S. comprised approximately 37% of revenues. This compares to 43% for the year ended December 31, 2021. Our foreign business is subject to economic, political and regulatory uncertainties and risks that are unique to each area of the world. Fluctuations in exchange rates may also affect the prices that foreign customers are willing to pay and may put us at a price disadvantage compared to other competitors. Potentially volatile shifts in exchange rates may negatively affect our financial position and results.

The loss of a significant customer may adversely affect our financial condition and results of operations. The percentage of revenues from our largest customer were 33% and 23% for the years ended December 31, 2022 and 2021, respectively. The loss of a large customer may significantly decrease revenues.

We may be exposed to liabilities under the foreign corrupt practices act and any determination that we violated these laws could have a material adverse effect on our business. We are subject to the Foreign Corrupt Practices Act ("FCPA"), and other laws that prohibit improper payments or offers of payments to foreign governments and their officials and political parties by U.S. persons and issuers as defined by the statute, for the purpose of obtaining or retaining business. It is our policy to implement safeguards to discourage these practices by our employees. However, our existing safeguards and any future improvements may prove to be less than effective, and our employees, consultants, sales agents or distributors may engage in conduct for which we might be held responsible. Violations of the FCPA may result in severe criminal or civil sanctions and we may be subject to other liabilities, which could negatively affect our business, operating results and financial condition.

Adverse results of legal proceedings could have a material adverse effect on us. We are subject to, and may in the future be subject to, a variety of legal proceedings and claims that arise out of the ordinary conduct of our business. Results of legal proceedings cannot be predicted with certainty. Irrespective of their merits, legal proceedings may be both lengthy and disruptive to our operations and may cause significant expenditure and diversion of management attention. We may be faced with significant monetary damages or injunctive relief against us that could have a material adverse effect on a portion of our business operations or a material adverse effect on our financial condition and results of operations.

Risks Related to Our Operations

We do not have commercial-scale manufacturing capability and have minimal commercial manufacturing experience. We operate GMP manufacturing facilities for device production; however, they are not of sufficient size for large commercial production. We do not have experience in large scale manufacturing, and currently rely on third-party contract manufacturers for a significant portion of our device production. We expect to depend on these contract manufacturers for the foreseeable future. Any performance failure on the part of our contract manufacturers could delay production of our current or future products, depriving us of potential product revenues and resulting in additional losses.

We have limited sales, marketing and distribution capabilities which may limit our ability to significantly increase sales quickly. We have limited internal capabilities in the sales, marketing, and distribution areas. There can be no assurance that we will be able to establish sales, marketing, and distribution capabilities internally or make arrangements with current collaborators or others to perform such activities or that such effort will be successful. If we decide to market any of our new products directly, we must either partner, acquire or internally develop a marketing and sales force with technical expertise and with supporting distribution capabilities. The acquisition or development of a sales, marketing and distribution infrastructure would require substantial resources, which may not be available to us or, even if available, divert the attention of our management and key personnel, and have a negative impact on further product development efforts.

Our inability to protect our patents, trademarks, trade secrets and other proprietary rights could adversely impact our competitive position. We believe that our patents, trademarks, trade secrets and other proprietary rights are important to our success and our competitive position. Accordingly, we commit substantial resources to the establishment and protection of our patents, trademarks, trade secrets and proprietary rights. We use various methods, including confidentiality agreements with employees, vendors, and customers, to protect our trade secrets and proprietary know-how for our products. We currently hold patents for products and have patents pending in certain countries for additional products that we market or intend to market. However, our actions to establish and protect our patents, trademarks, and other proprietary rights may be inadequate to prevent imitation of our products by others or to prevent others from claiming violations of their trademarks and proprietary rights by us. If our products are challenged as infringing upon patents of other parties, we may be required to modify the design of the product, obtain a license, or litigate the issues, all of which may have an adverse business effect on us.

We may be subject to claims that our products or processes infringe the intellectual property rights of others, which may cause us to pay unexpected litigation costs or damages, modify our products or processes or prevent us from selling our products. Although it is our intention to avoid infringing or otherwise violating the intellectual property rights of others, third parties may nevertheless claim that our processes and products infringe their intellectual property and other rights. Our strategies of capitalizing on growing international demand as well as developing new innovative products across multiple business lines present similar infringement claim risks both internationally and in the U.S. as we expand the scope of our product offerings and markets. We compete with other companies for contracts in some small or specialized industries, which increases the risk that the other companies will develop overlapping technologies leading to an increased possibility that infringement claims will arise. Whether or not these claims have merit, we may be subject to costly and time-consuming legal proceedings, and this could divert management's attention from operating our business. In order to resolve such proceedings, we may need to obtain licenses from these third parties or substantially re-engineer or rename our products in order to avoid infringement. In addition, we might not be able to obtain the necessary licenses on acceptable terms, or at all, or be able to re-engineer or rename our products successfully.

We may not be able to protect our intellectual property in countries outside the United States. Intellectual property law outside the United States is uncertain and in many countries is currently undergoing review and revisions. The laws of some countries do not protect our patent and other intellectual property rights to the same extent as United States laws. This is particularly relevant to us as a significant amount of our current and projected future sales are outside of the United States. Third parties may attempt to oppose the issuance of patents to us in foreign countries by initiating opposition proceedings. Opposition proceedings against any of our patent filings in a foreign country could have an adverse effect on our corresponding patents that are issued or pending in the United States. It may be necessary or useful for us to participate in proceedings to determine the validity of our patents or our competitors' patents that have been issued in countries other than the U.S. This could result in substantial costs, divert our efforts and attention from other aspects of our business, and could have a material adverse effect on our results of operations and financial condition.

Any failure to achieve and maintain the high design and manufacturing standards that our products require may seriously harm our business. Our products require precise, high-quality manufacturing. Achieving precision and quality control requires skill and diligence by our personnel as well as our vendors. Our failure to achieve and maintain these high manufacturing standards, including the incidence of manufacturing errors, design defects or component failures could result in patient injury or death, product recalls or withdrawals, delays or failures in product testing or delivery, cost overruns or other problems that could seriously hurt our business. Additionally, the large amount of AXP disposable inventory certain distributors and end-users maintain may delay the identification of a manufacturing error and expand the financial impact. A manufacturing error or defect, or previously undetected design defect, or uncorrected impurity or variation in a raw material component, either unknown or undetected, could affect the product. Despite our high manufacturing standards, we cannot completely eliminate the risk of errors, defects or failures. If we or our vendors are unable to manufacture our products in accordance with necessary quality standards, our business and results of operations may be negatively affected.

Our products may be subject to product recalls which may harm our reputation and divert our managerial and financial resources. The FDA and similar governmental authorities in other countries have the authority to order the mandatory recall of our products or order their removal from the market if the governmental entity finds our products might cause adverse health consequences or death. The FDA may also seize product or prevent further distribution. A government-mandated or voluntary recall by us could occur as a result of component failures, manufacturing errors or design defects (including labeling defects). In the past, we have initiated voluntary recalls of some of our products and we could do so in the future. Any recall of our products may harm our reputation with customers, divert managerial and financial resources and negatively impact our profitability.

We are dependent on our suppliers and manufacturers to meet existing regulations. Certain of our suppliers and manufacturers are subject to heavy government regulations, including FDA QSR compliance, in the operation of their facilities, products and manufacturing processes. Any adverse action by the FDA against our suppliers or manufacturers could delay supply or manufacture of component products required to be integrated or sold with our products. Although we attempt to mitigate this risk through inventory held directly or through distributors, and audit our suppliers, there are no assurances we will be successful in identifying issues early enough to allow for corrective action or transition to an alternative supplier, or in locating an alternative supplier or manufacturer to meet product shipment or launch deadlines. As a result, our sales, contractual commitments and financial forecasts may be significantly affected by any such delays.

Dependence on suppliers for custom components may impact the production schedule. We obtain products and custom components from a limited number of suppliers. If the supplier raises the price or discontinues production, we may have to find another qualified supplier to provide the item or re-engineer the item. In the event that it becomes necessary for us to find another supplier, we would first be required to qualify the quality assurance systems and product quality of that alternative supplier. Any operational issues with re-engineering or the alternative qualified supplier may impact the production schedule, therefore delaying revenues, and this may cause the cost of disposables or key components to increase.

Dependence on contract manufacturers for disposable products. We obtain the majority of our disposable products from contract manufacturers. Production halts or delays by these manufacturers could have a significant impact on our business. Our safety stock levels are generally not sufficient to handle an unexpected shut-down or delay in production by these contract manufacturers. In the event of a significant unplanned delay in production, we may need to find a new contract manufacturer, which could be a lengthy process and require a significant financial commitment, impacting our ability to fulfill customer orders and maintain current sales levels for a period of time until the new contract manufacturer can start production of our disposable products.

Failure to meet the financial covenant in our Technology License and Escrow Agreement could decrease our AXP revenues. Under our Sixth Amended and Restated Technology License and Escrow Agreement with CBR if our cash balance and short-term investments net of non-convertible debt and borrowed funds that are payable within one year are not greater than $1,000,000 at any month end, CBR may take possession of the escrowed intellectual property and initiate manufacturing of the applicable device and disposables. If this were to occur, our revenues would be negatively impacted. In order to remain compliant, we may have to complete additional financings or provide consideration to the counter party to modify the obligations.

Failure to retain or hire key personnel may adversely affect our ability to sustain or grow our business. Our ability to operate successfully and manage our potential future growth depends significantly upon retaining key research, technical, clinical, regulatory, sales, marketing and managerial personnel. Our future success partially depends upon the continued services of key technical and senior management personnel. Our future success also depends on our continuing ability to attract, retain and motivate highly qualified managerial and technical personnel. The inability to retain or attract qualified personnel could have a significant negative effect upon our efforts and thereby materially harm our business and future financial condition.

Most of our operations are conducted at a single location. Any disruption at our facilities could delay revenues or increase our expenses. Our U.S. device operations are conducted at a single location although we contract the manufacturing of certain devices, disposables and components. We take precautions to safeguard our facilities, through insurance, health and safety protocols, and off-site storage of computer data. However, a natural disaster, such as a fire, flood or earthquake, could cause substantial delays in our operations, damage or destroy our manufacturing equipment or inventory, and cause us to incur additional expenses. The insurance we maintain against fires, floods, and other natural disasters may not be adequate to cover our losses in any particular case.

Failure to maintain and/or upgrade our information technology systems may have an adverse effect on our operations. We rely on various information technology systems to manage our operations, and we evaluate these systems against our current and expected requirements. Although we have no current plans to implement modifications or upgrades to our systems, we will eventually be required to make changes to legacy systems and acquire new systems with new functionality. Any information technology system disruptions, if not anticipated and appropriately mitigated, could have an adverse effect on our business and operations.

If we fail to maintain proper and effective internal controls, our ability to produce accurate and timely financial statements could be impaired, which could harm our operating results, our ability to operate our business and investors' views of us. We are required to establish and maintain adequate internal control over financial reporting, which are processes 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. We are also required to comply with Section 404 of the Sarbanes-Oxley Act of 2002, which (among other things) requires public companies to conduct an annual review and evaluation of their internal control over financial reporting. However, as a "smaller reporting company," we are not required to obtain an auditor attestation regarding our internal control over financial reporting. If, in the future, we require an attestation report from our independent registered public accounting firm and that firm is unable to provide an unqualified attestation report on the effectiveness of our internal controls over financial reporting, investor confidence and, in turn, our stock price could be materially adversely affected.

Security breaches and other disruptions could compromise our information and expose us to liability, which would cause our business and reputation to suffer. In the ordinary course of the Company's business, the Company collects and stores sensitive data, including intellectual property, our proprietary business information and that of our customers, suppliers and business partners and personally identifiable information of the Company's employees on its networks. The secure processing, maintenance and transmission of this information is critical to the Company's operations and business strategy. Despite the Company's security measures, its information, technology and infrastructure may be vulnerable to attacks by hackers or breached due to employee error, malfeasance or other disruptions. Any such breach could compromise the Company's networks and the information stored there could be accessed, publicly disclosed, lost or stolen. Any such access, disclosure or other loss of information could result in legal claims or proceedings or regulatory penalties and could disrupt the Company's operations and the services it provides to customers, damage the Company's reputation, and cause a loss of confidence in the Company's products and services, which could adversely affect the Company's business.

Our business has been adversely affected by the Coronavirus (COVID-19) pandemic and may continue to be adversely affected by the pandemic. We believe that the COVID-19 pandemic has had a material negative impact on our business and results of operations. The pandemic had a significant impact on the cord blood industry, with fewer cord blood units being stored globally after the start of the pandemic. Internationally, customs delays have led some customers to temporarily switch to manual processing due to the long wait to clear products through customs departments with reduced staffing. As a result, the pandemic resulted in disruption to our supply chain and in customer demand during fiscal 2021. The continued impact of the pandemic on our business and results of operations will depend on future developments relating to the pandemic in general and the cord blood industry in particular, and such future developments are highly uncertain and cannot be predicted. Such developments may include the continued geographic spread of the virus, the severity of the disease, the duration of the outbreak, the actions that may be taken by various governmental authorities in response to the outbreak, and the possible continued impact on the U.S. or global economy. As a result, at the time of this filing, it is impossible to predict the continued impact of the pandemic on our business, liquidity, capital resources and financial results.

Risks Related to Our Industry

Our business is heavily regulated, resulting in increased costs of operations and delays in product sales. Many of our products require FDA approval or clearance to sell in the U.S. and will require approvals from comparable agencies to sell in foreign countries. These authorizations may limit the U.S. or foreign markets in which our products may be sold. Further, our products must be manufactured under the requirements of our quality system for continued CE-Marking so they can continue to be marketed and sold in Europe. These requirements are similar to the QSR of both the FDA and California Department of Public Health. Failure to comply with or incorrectly interpret these quality system requirements and regulations may subject us to delays in production while we correct deficiencies found by the FDA, the State of California, or our notifying body as a result of any audit of our quality system. If we are found to be out of compliance, we could receive a Warning Letter or an untitled letter from the FDA or even be temporarily shut down in manufacturing and product sales while the non-conformances are rectified. Also, we may have to recall products and temporarily cease their manufacture and distribution, which would increase our costs and reduce our revenues. The FDA may also invalidate our PMA or 510(k) if appropriate regulations relative to the PMA or 510(k) products are not met. The notified bodies may elect to not renew CE-Mark certification. Any of these events would negatively impact our revenues and costs of operations.

Changes in governmental regulations may reduce demand for our products or increase our expenses. We compete in many markets in which we and our customers must comply with federal, state, local and international regulations, such as environmental, health and safety and food and drug regulations. We develop, configure and market our products to meet customer needs created by those regulations. Any significant change in regulations could reduce demand for our products or increase our expenses. For example, many of our instruments are marketed to the industry for enabling new regenerative therapies. Changes in the FDA's regulation of the devices and products directed at regenerative medicine, and development process for new therapeutic applications could have an adverse effect on the demand for these products.

To sell in international markets we are subject to regulation in foreign countries. In cooperation with our distribution partners, we market our current and future products both domestically and in many foreign markets. A number of risks are inherent in international transactions. In order for us to market our products in certain non-U.S. jurisdictions, we need to obtain and maintain required regulatory approvals or clearances and must comply with extensive regulations regarding safety, manufacturing processes and quality. These regulations, including the requirements for approvals or clearances to market, may differ from the FDA regulatory scheme. International sales also may be limited or disrupted by political instability, price controls, trade restrictions and changes in tariffs. Additionally, fluctuations in currency exchange rates may adversely affect demand for our products by increasing the price of our products in the currency of the countries in which the products are sold.

There can be no assurance that we will obtain regulatory approvals or clearances in all of the countries where we intend to market our products, or that we will not incur significant costs in obtaining or maintaining foreign regulatory approvals or clearances, or that we will be able to successfully commercialize current or future products in various foreign markets. Delays in receipt of approvals or clearances to market our products in foreign countries, failure to receive such approvals or clearances or the future loss of previously received approvals or clearances could have a substantial negative effect on our results of operations and financial condition.

Operating in foreign jurisdictions subjects us to regulation by non-U.S. authorities. We have operations in India, and as such are subject to Indian regulatory agencies. A number of risks are inherent in conducting business and clinical operations overseas. In order for us to operate as a majority owned foreign corporation in India, we are subject to financial regulations imposed by the Reserve Bank of India. This includes the rules specific to the capital funding, pledging of assets, repatriation of funds and payment of dividends from and to the foreign subsidiaries and from and to us in the U.S.

If our competitors develop and market products that are more effective than our product candidates or obtain regulatory and market approval for similar products before we do, our commercial opportunity may be reduced or eliminated. The development and commercialization of new pharmaceutical products is competitive, and we will face competition from numerous sources, including major biotechnology and pharmaceutical companies worldwide. Many of our competitors have substantially greater financial and technical resources and development, production and marketing capabilities than we do. In addition, many of these companies have more experience than we do in pre-clinical testing, clinical trials and manufacturing of compounds, as well as in obtaining FDA and foreign regulatory approvals. As a result, there is a risk that one of the competitors will develop a more effective product for the same indications for which we are developing a product or, alternatively, bring a similar product to market before we can. With regards to the BioArchive and AXP Systems, numerous larger and better-financed medical device manufacturers may choose to enter this market.

Changes in healthcare policy could subject us to additional regulatory requirements that may delay the commercialization of our products and increase our costs. The U.S. government and other governments have shown significant interest in pursuing healthcare reform. Any government-adopted reform measures could adversely impact the pricing of our diagnostic products and tests in the U.S. or internationally and the amount of reimbursement available from governmental agencies or other third-party payors. The continuing efforts of the U.S. and foreign governments, insurance companies, managed care organizations and other payors of healthcare services to contain or reduce healthcare costs may adversely affect our ability to set prices for our products and services that we believe are fair, which may impact our ability to generate revenues and achieve and maintain profitability.

New laws, regulations and judicial decisions, or new interpretations of existing laws, regulations and judicial decisions, that relate to healthcare availability, methods of delivery or payment for products and services, or sales, marketing or pricing, may limit our potential revenue or force us to revise our research and development programs. The pricing and reimbursement environment may change in the future and become more challenging for several reasons, including policies advanced by the current executive administration in the U.S., new healthcare legislation or fiscal challenges faced by government health administration authorities. Specifically, in both the U.S. and certain foreign jurisdictions, there have been a number of legislative and regulatory proposals to change the healthcare system in ways that could affect our ability to sell our products profitably.

The Food and Drug Administration Amendments Act of 2007 gives the FDA enhanced post-marketing authority, including the authority to require post-marketing studies and clinical studies of products, labeling changes based on new safety information, and compliance with risk evaluations and mitigation strategies approved by the FDA. The FDA's exercise of this authority could result in delays or increased costs during product development, clinical studies and regulatory review, increased costs to assure compliance with post-approval regulatory requirements, and potential restrictions on the sale and/or distribution of approved products, all of which could materially adversely affect our business, prospects and financial condition.

Product liability and uninsured risks may adversely affect the continuing operations. We operate in an industry susceptible to significant product liability claims. We may be liable if any of our products or services cause injury, illness, or death. These claims may be brought by individuals seeking relief or by groups seeking to represent a class. We also may be required to recall certain of our products should they become damaged or if they are defective. We are not aware of any material product liability claims against us. However, product liability claims may be asserted against us in the future based on events we are not aware of at the present time. We maintain a product liability policy and a general liability policy that includes product liability coverage. However, a product liability claim against us could have a material adverse effect on our business or future financial condition.

Risks Related to Operating Results and Financial Markets

We have incurred net losses and we anticipate that our losses will continue. We have not been profitable for a significant period. For the years ended December 31, 2022 and 2021, we had a net loss of $11,812,000 and $11,880,000 respectively and an accumulated deficit at December 31, 2022, of $266,193,000. The report of our independent auditors on our December 31, 2022 financial statements includes an explanatory paragraph indicating there is substantial doubt about our ability to continue as a going concern. We will continue to incur significant costs as we develop and market our current products and related applications. Although we are executing our business plan to develop, market and launch new products, continuing losses may impair our ability to fully meet our objectives for new product sales or threaten our ability to continue as a going concern in future years.

We will need to raise additional capital to fund our operations and the furtherance of our business plan. Due to our recurring losses from operations and the expectation that we will continue to incur losses in the future, we will need to raise additional capital. We have historically relied upon private and public sales of our equity, as well as debt financings to fund our operations. In order to raise additional capital, we may seek to sell additional equity and/or debt securities or obtain a credit facility or other loan, which we may not be able to do on favorable terms, or at all. Our ability to obtain additional financing will be subject to a number of factors, including market conditions, our operating performance and investor sentiment. If we are unable to raise additional capital when required or on acceptable terms, we may have to significantly delay, scale back or discontinue the development and/or commercialization of one or more of our product candidates, restrict our operations or obtain funds by entering into agreements on unfavorable terms.

Risks Related to Our Common Stock

If our common stock, including the price of our common stock does not meet the requirements of the Nasdaq Capital Market Stock Exchange ("Nasdaq"), our shares may be delisted. Our ability to publicly or privately sell equity securities and the liquidity of our common stock could be adversely affected if we are delisted. The listing standards of Nasdaq provide, among other things, that a company may be delisted if the bid price of its stock drops below $1.00 for a period of 30 consecutive business days. Delisting from Nasdaq could adversely affect our ability to raise additional financing through the public or private sale of equity securities, would significantly affect the ability of investors to trade our securities and would negatively affect the value and liquidity of our common stock. Delisting could also have other negative results, including the potential loss of confidence by employees, the loss of institutional investor interest and fewer business development opportunities.

Liquidity of our common stock. Although there is a public market for our common stock, trading volume has been historically low, which could impact the stock price and the ability to sell shares of our common stock. We can give no assurance that an active and liquid public market for shares of common stock will continue in the future. In addition, future sales of large amounts of common stock could adversely affect the market price of our common stock and our ability to raise capital. The price of our common stock could also drop as a result of the exercise of options for common stock or the perception that such sales or exercise of options could occur. These factors could also have a negative impact on the liquidity of our common stock and our ability to raise funds through future stock offerings.

We do not pay cash dividends. We have never paid any cash dividends on our common stock and do not intend to pay cash dividends in the foreseeable future. Instead, we intend to apply earnings, if any, to the expansion and development of our business. Thus, the liquidity of your investment is dependent upon your ability to sell stock at an acceptable price. The price can go down as well as up and may limit your ability to realize any value from your investment, including the initial purchase price.

Our Amended and Restated Bylaws provide that the Court of Chancery of the State of Delaware will be the sole and exclusive venue for certain litigation that may be initiated by our stockholders, which may limit a stockholder's ability to obtain a favorable judicial forum for such disputes with us or our directors, officers or employees.

Our Amended and Restated Bylaws provide that, unless we consent in writing to the selection of an alternative venue, the Court of Chancery of the State of Delaware will be the sole and exclusive venue for (i) any derivative action or proceeding brought on our behalf, (ii) any action asserting a claim for breach of a fiduciary duty owed by any of our directors, officers, employees or agents to us or our stockholders, (iii) any action asserting a claim arising pursuant to any provision of the Delaware General Corporation Law, our certificate of incorporation or bylaws or (iv) any action asserting a claim governed by the internal affairs doctrine, in each case subject to the Court of Chancery of the State of Delaware having personal jurisdiction over the indispensable parties named as defendants therein. This choice of venue provision will not apply to actions or proceedings brought to enforce a duty or liability created by the Securities Act or the Exchange Act.

This choice of venue provision may limit a stockholder's ability to bring certain claims in a judicial forum that it finds favorable for disputes with us or our directors, officers, employees or agents, which may discourage the filing of lawsuits with respect to such claims. If a court were to find this choice of venue provision to be inapplicable or unenforceable in an action, we may incur additional costs associated with resolving such action in another jurisdiction, which could adversely affect our business and financial condition.

Risks Related to Our Planned Contract Development and Manufacturing Organization (CDMO) Service

Initiating new business activities or strategies or significantly expanding existing business activities or strategies may expose us to new risks and may increase our costs associated with doing business. Initiating new business activities or strategies or significantly expanding existing business activities or strategies may expose us to new or increased financial, regulatory, reputational and other risks. Such innovations are important and necessary ways to grow our business and respond to changing circumstances in our industry; however, we cannot be certain that we will be able to manage the associated risks and compliance requirements effectively. Such risks include a lack of experienced management-level personnel, increased administrative burden, increased logistical problems common to large, expansive operations, increased credit and liquidity risk and increased regulatory scrutiny.

Will need to raise additional capital in order to execute our planned CDMO business, the failure of which could adversely impact our business transformation. Without adequate funding, we may not be able to establish CDMO facilities in the United States. We expect to continue to finance start-up costs related to our CDMO division, primarily by issuing equity or convertible debt securities, which could significantly dilute the ownership of existing stockholders. Furthermore, any newly issued securities could have rights, preferences and privileges senior to those of our existing common stock; and any issuances of equity securities may be at or below the prevailing market price of our common stock, which could cause the market price of our common stock to decline. We may have difficulty obtaining additional funds, and we may have to accept terms that would adversely affect our stockholders. In addition, any adverse conditions in the credit and equity markets may adversely affect our ability to raise funds when needed. The failure to achieve adequate funding may delay our planned CDMO business program and service launches.

Our success may depend on our ability to attract and retain key scientific or professional talents in the CDMO field. The Company currently lacks certain unique personnel for CDMO services. We will need to actively search and recruit the talents that are necessary for our business growth. Our success in transforming into CDMO services depends substantially on the efforts and abilities to recruit and retain key personnel. The competition for qualified CDMO services key personnel, is intense. The inability to hire, train, and retain key personnel could delay the launching of our CDMO services, disrupt our business, and interfere with our ability to execute our CDMO business plan.

We will need to increase the size and capabilities of our organization to support our CDMO services, and we may experience difficulties in managing this growth. As our development and commercialization plans develop, we will need to add a significant number of additional managerial, operational, sales, marketing, financial, and other personnel. Future growth may create significant added responsibilities for Company management. Our future financial performance and our ability to successfully run our CDMO services division will depend, in part, on our ability to effectively manage future growth.

Our competitive advantages such as our CAR-TXpress™ technology being able to compete favorably and profitably in the CDMO cell manufacturing business, are critical to the success of our planned CDMO business. While we believe our proprietary CAR-TXpress™ technology platform is superior to other existing cell processing technologies, our data is based on very limited sources. CAR-TXpress™ technology has not been used to manufacture any cell therapy product candidate previously. The ability to accurately calculate total cost for the manufacturing expenses, expected future revenue, and profitability can vary among different product candidates and is difficult to estimate. There is no guarantee that our technology would reduce the manufacturing cost and deliver the competitive advantage that we have anticipated.

We are dependent on our ability to predict the CDMO cell manufacturing market and to identify customers. While there is an increasing number of clinical trials for cell therapies, the number of cell and gene therapy products that have reached commercial production is still limited. Cell therapy is an emerging industry and a significant global market for manufacturing services may never emerge. The number of customers who may use cell-based therapies, and the demand for cell manufacturing services, is difficult to estimate. If cell therapies under development are not proven safe and effective, demonstrate unacceptable risks or side effects or fail to receive regulatory approval if required; our manufacturing business may be significantly impaired. While the therapeutic application of cells to treat serious diseases is currently being explored by a number of companies, to date there are only a handful of approved cell therapy products in the U.S. Ultimately, our success in deriving revenue from manufacturing depends on the development and growth of a broad and profitable global market for cell therapies and services and our ability to capture a share of this market through identifying the proper customers.

We may fail to effectively utilize licensed technologies. We have entered into a licensing agreement and in the future, we may seek additional collaborations or strategic alliances or enter into additional licensing arrangements with organizations that we believe will complement or augment our own technologies and services. Licensing and collaborations arrangements are subject to numerous risks, and we may not realize the benefits of such alliances or licensing arrangements as we anticipated.

External competition from other CDMO cell manufacturing service providers may be harmful to our planned CDMO business. We face competition from other companies that are large, well-established manufacturers with financial, technical, research and development and sales and marketing resources that are significantly greater than ours. We also face competition from academic and research institutions that may choose to self-manufacture rather than utilize a contract manufacturer. To be successful, we will need to convince potential customers that our technology and capabilities are more innovative, of higher-efficiency and more cost-effective than could be achieved through internal manufacturing; and demonstrate that our technology and expertise in automated cell processing is unique to the industry. Our ability to achieve this and to successfully compete against other manufacturers will depend, in large part, on our success in developing innovative cell processing technologies that improve the efficiency and reduce the drug cost associated with cell therapy manufacturing. If we are unable to successfully demonstrate our competitive advantages, we may not be able to compete against other manufacturers.

While there is an increasing number of product candidates in clinical trials with a smaller number that have reached commercial production, cell therapy is a developing industry and a significant global market for manufacturing services may never emerge. Cell therapy is in its early stages and is still a developing area of research, with few cell therapy products approved for clinical use. Many of the existing cellular therapy candidates are based on novel cell technologies that are inherently risky and may not be understood or accepted by the marketplace, making it difficult for their own funding to enable them to continue their business. The number of people who may use cell or tissue-based therapies, and the demand for cell processing services, is difficult to forecast. If cell therapies under development by third parties are not proven safe and effective, demonstrate unacceptable risks or side effects or, where required, fail to receive regulatory approval, our manufacturing business will be significantly impaired. While the therapeutic application of cells to treat serious diseases is currently being explored by a number of companies, to date there are only a handful of approved cell therapy products in the U.S. Ultimately, our success in deriving revenue from manufacturing depends on the development and growth of a broad and profitable global market for cell, gene and tissue-based therapies and services and our ability to capture a share of this market.

ITEM 1B. Unresolved Staff Comments

None.

ITEM 2. Properties

We lease a facility with approximately 28,000 square feet of space located in Rancho Cordova, California. The facility is comprised of warehouse space, manufacturing operations, office space, a biologics lab, a clean room, and a research and development lab. The lease expires May 31, 2024.

We lease a facility with approximately 35,000 square feet of space in Rancho Cordova, California for space that will house our planned CDMO cell manufacturing operations. The lease expires September 30, 2027, with the option to renew the lease for two 5-year periods.

In Gurugram India, we lease an office facility with approximately 1,500 square feet, which is used for general office space. The lease expires September 14, 2023; however, either party can terminate the lease with three months' notice.

We believe our facilities are adequate for our present needs and expect them to remain adequate for the foreseeable future.

ITEM 3. Legal Proceedings

In the normal course of operations, we may have disagreements or disputes with distributors, vendors or employees. Such potential disputes are seen by management as a normal part of business and while the outcome of such disagreements and disputes cannot be predicted with certainty, except as described in *Note 10*, "Commitments and Contingencies," in "Item 8. Financial Statements – Notes to Consolidated Financial Statements", we do not believe that any pending legal proceedings are material. Regardless of the outcome, litigation can have an adverse impact on us because of defense and settlement costs, diversion of management resources and other factors.

The material set forth in *Note 10*, "Commitments and Contingencies," in "Item 8. Financial Statements – Notes to Consolidated Financial Statements" is incorporated herein by reference.

ITEM 4. Mine Safety Disclosures

Not applicable.

PART II

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

Our common stock, $0.001 par value, is listed on the Nasdaq Capital Market under the symbol THMO.

We have not paid cash dividends on our common stock and do not intend to pay a cash dividend in the foreseeable future. There were approximately 140 stockholders of record on March 1, 2023, not including beneficial owners who own their stock in street name through Cede & Co. and others.

The Company did not repurchase any of its shares during the quarter ended December 31, 2022.

ITEM 6. [Reserved]

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

Certain statements contained in this section and other parts of this Annual Report on Form 10-K which are not historical facts are forward looking statements and are subject to certain risks and uncertainties. Our actual results may differ significantly from the projected results discussed in the forward-looking statements. Factors that might affect actual results include, but are not limited to, those discussed in ITEM 1A "RISK FACTORS" and other factors identified from time to time in our reports filed with the SEC. The following discussion should be read in conjunction with our consolidated financial statements contained in this Annual Report.

General Overview

The Company develops and commercializes a range of automated technologies for cell-banking, cell-processing, and cell-based therapeutics. Since the 1990's ThermoGenesis Holdings has been a pioneer in, and a leading provider of automated systems that isolate, purify and cryogenically store units of hematopoietic stem and progenitor cells for the cord blood banking industry. The Company was founded in 1986 and is incorporated in the State of Delaware and headquartered in Rancho Cordova, CA.

The Company provides the AutoXpress® and BioArchive® platforms for automated clinical bio-banking, PXP® platform for point-of-care cell-based therapies and CAR-TXpress™ platform for large scale cell manufacturing services. All product lines are reporting as a single reporting segment in the financial statements.

See the "Business" section in Part I, Item 1 of this Form 10-K for additional information.

Reverse Stock Split

On December 22, 2022, the Company effected a one (1) for forty-five (45) reverse stock split of its issued and outstanding common stock. The total number of shares of common stock authorized for issuance by the Company of 350,000,000 shares did not change in connection with the reverse stock split.

All historical share amounts disclosed herein have been retroactively restated to reflect the reverse split and subsequent share exchange. No fractional shares were issued as a result of the reverse stock split, as fractional shares of common stock were rounded up to the nearest whole share.

Results of Operations

Year Ended December 31, 2022 Compared to the Year Ended December 31, 2021

Net Revenues

Net revenues for the year ended December 31, 2022, were $10,483,000 compared to $9,294,000 for the year ended December 31, 2021, an increase of $1,189,000 or 13%. The increase was due to domestic AXP disposable sales which were approximately $1.3 million higher in 2022. At the beginning of 2021 our largest domestic customer made the decision to transition to just in time inventory and depleted their existing inventory in lieu of additional purchases decreasing our sales at the beginning of last year. In 2022, they purchased products based on demand. We anticipate AXP disposable domestic sales will be more in line with 2022 in future periods.

Revenues were comprised of the following:

	Years Ended December 31,	
	2022	2021
AXP	$ 6,391,000	$ 5,138,000
BioArchive	2,215,000	2,345,000
CAR-TXpress	1,129,000	1,284,000
Manual Disposables	655,000	421,000
Other	93,000	106,000
	$ 10,483,000	$ 9,294,000

Gross Profit

The Company's gross profit was $2,710,000 or 26% of net revenues for the year ended December 31, 2022, compared to $3,493,000 or 38% for the year ended December 31, 2021, a decrease of $783,000 or 22%. Our gross profit percentage was 12% lower in 2022 as compared to 2021. The decrease was primarily due to higher costs from our AXP disposable contract manufacturer, with our costs increasing by approximately 28% in 2022. In part to obtain better pricing, we terminated our agreement with the contract manufacturer in 2022 and are in the process of transitioning to a new supplier for our AXP bagsets. The new supplier will provide lower pricing allowing us to decrease our AXP disposable costs by an estimated 10 – 15%. However, we do not expect to see the benefits of the lower pricing until 2024 as the Company will likely be selling the remaining inventory purchased from our original supplier for the majority of 2023. Additionally, gross profit percentage was lower in 2022 due to excess capacity charges in the second half of the year as a result of reduced manufacturing as the Company focused on its transition to being a CDMO service provider which is expected to launch in 2023.

Selling, General and Administrative Expenses

Selling, general and administrative expenses were $7,244,000 for the year ended December 31, 2022, as compared to $8,515,000 for the year ended December 31, 2021, a decrease of $1,271,000 or 15%. The decrease was driven by stock compensation expense, which decreased by approximately $2 million primarily due to the accelerated expense for the stock options that were voluntarily surrendered by Company executives in 2021. This was offset by approximately $1 million in rent and operating expenses for our new CDMO facility which we began leasing in April 2022.

Research and Development Expenses

Research and development expenses were $1,659,000 for the year ended December 31, 2022, compared to $2,209,000 for the year ended December 31, 2021, a decrease of $550,000 or 25%. The decrease was driven by reduced stock compensation expense related to the accelerated expense for the stock options that were voluntarily surrendered in 2021 and the Company not backfilling the Chief Technology Officer position which was vacated at the beginning of 2022.

Interest Expense

Interest expense decreased to $5,616,000 for the year ended December 31, 2022, as compared to $6,103,000 for the year ended December 31, 2021, a difference of $487,000. The decrease is due to lower interest expense related to the portion of the Boyalife Convertible Promissory Note that was converted in June 2022.

Gain on Extinguishment of Debt

The Company recorded a gain of extinguishment of debt of $652,000 for the year ended December 31, 2021, related to the principal and accrued interest for the Paycheck Protection Program loan the Company received in 2020, which was forgiven in the first quarter of 2021.

Liquidity and Capital Resources

At December 31, 2022, we had cash and cash equivalents of $4,177,000. We have used cash generated from operations and private and public placement of equity securities as our primary sources of liquidity.

The Company has a Revolving Credit Agreement with Boyalife Group, Inc. As of December 31, 2022, the Company had drawn down $7,000,000 of the $10,000,000 that is available under the Revolving Credit Agreement, which matures in December 2023. Boyalife Group Inc. is owned and controlled by the Company's Chief Executive Officer and Chairman of our Board of Directors. The Company does not expect to be able to draw additional funds from the Revolving Credit Agreement in 2023.

The Company also has an unsecured convertible promissory note with an accredited investor pursuant to which the Company issued and sold to such investor with an original principal amount of $1,000,000. As of March 2023, the outstanding balance of the note was $397,000, which is due July 31, 2023.

The Company has incurred historical losses from operations and expects to continue to incur operating losses in the near future. We anticipate opening our new CDMO facility in 2023 and increasing cash from operations. The Company will need to raise additional capital to grow its business, fund operating expenses and make interest payments. The Company's ability to fund its liquidity needs is subject to various risks, many of which are beyond its control. The Company may seek additional funding through debt borrowings, sales of debt or equity securities or strategic partnerships. The Company cannot guarantee that such funding will be available on a timely basis, in needed quantities or on terms favorable to the Company, if at all. These factors and other indicators raise substantial doubt about the Company's ability to continue as a going concern within one year from the filing date of this report.

We manage the concentration of credit risk with our customers and distributors through a variety of methods including, pre-shipment deposits, credit reference checks and credit limits. Although management believes that our customers and distributors are sound and creditworthy, a severe adverse impact on their business operations could have a corresponding material effect on their ability to pay timely and therefore on our net revenues, cash flows and financial condition.

Critical Accounting Policies and Estimates

The preparation of our consolidated financial statements requires us to make estimates and judgments that affect the reported amounts of assets, liabilities, revenues and expenses and related disclosure of contingent assets and liabilities. On an on-going basis, we evaluate our estimates, including those related to stock-based compensation, depreciation, fair values of intangibles and goodwill, bad debts, inventories, warranties, and contingencies. We base our estimates on historical experience and on various other assumptions that are believed to be reasonable under the circumstances, the results of which form the basis for making judgments about the carrying values of assets and liabilities that are not readily apparent from other sources. Actual results may differ from these estimates under different assumptions or conditions. *See Note 3* "Summary of Significant Accounting Policies" to the Notes to the Consolidated Financial Statements contained in Item 8. We believe the following policies are critical and require significant judgement by the Company:

Revenue Recognition

The Company's revenues primarily consist of device sales and service revenue.

Device Sales
Device sales include devices and consumables for BioArchive, AXP, CAR-TXpress and manual disposables. Revenue is recognized when control of the devices passes to the customer, and the Company's performance obligation has been satisfied.

Service Revenue
Service revenue principally consists of maintenance contracts for BioArchive, AXP and CAR-TXpress products. Devices sold have warranty periods of one to two years. After the warranty expires, the Company offers separately priced annual maintenance contracts. Under these contracts, customers pay in advance. These prepayments are recorded as deferred revenue and recognized over time as the contract performance obligations are satisfied.

Revenue is recognized based on the following five-step process as outlined in the Accounting Standards Codification ("ASC") Topic 606, "Revenue from Contracts with Customers": (i) Identify the Contract with the Customer; (ii) Identify Performance Obligations in the Contract; (iii) Determine the Transaction Price; (iv) Allocate the Transaction Price; and (v) Satisfaction of the Performance Obligations (and Recognize Revenue).

Revenues are recorded net of discounts. Shipping and handling fees billed to customers are included in net revenues, while the related costs are included in cost of revenues. Most sales are made with FOB origin shipping terms, with title and control of the goods passing to the customer at the time of shipment. Payments from domestic customers are normally due in two months or less after the title transfers, the service contract is executed, or the services have been rendered. For international customers, payment terms may extend up to 120 days. All sales have fixed pricing and there are currently no variable components included in the Company's revenue.

Generally, all sales are contract sales (with either an underlying contract or purchase order). The Company does not have any material contract assets. When invoicing occurs prior to revenue recognition, a contract liability is recorded (as deferred revenue on the consolidated balance sheet).

Except for limited exceptions, there is no right of return provided for distributors or customers. For distributors, the Company has no control over the movement of goods to the end customer. The Company's distributors control the timing, terms and conditions of the transfer of goods to the end customer. Additionally, for sales of products made to distributors, the Company considers a number of factors in determining when revenue is recognized. These factors include, but are not limited to, whether the payment terms offered to the distributor are considered to be non-standard, the distributor's history of adhering to the terms of its contractual arrangements with the Company, whether the Company has a pattern of granting concessions for the benefit of the distributor, and whether there are other conditions that may indicate that the sale to the distributor is not substantive.

Inventories

We value inventory at the lower of cost or net realizable value. Cost is determined on a first in first out basis. This policy requires us to make estimates regarding the net realizable value of our inventory, including an assessment of excess or obsolete inventory. Our determination of excess and obsolete inventory requires judgement, which is based on several factors, including demand forecasts, prior sales history, and industry trends. For disposable items with an expiration date, we consider the remaining shelf life in our analysis. Based on our evaluation, an allowance is recorded for inventory which we believe may ultimately not be sold to customers. We update our evaluation every quarter, increasing or decreasing the allowance based on the most current information available at the time. If our actual demand is less than anticipated, we may be required to take additional obsolete inventory charges, decreasing our gross margin and adversely impacting net operating results.

In addition, we sometimes purchase inventory in large quantities to obtain purchase discounts from our suppliers. This leads the Company to split inventory between short term and long term. The Company uses judgement and the forecasted demand information available to determine whether inventory should be recorded as long term.

Off Balance Sheet Arrangements

We have no off-balance sheet arrangements.

ITEM 7A. Quantitative and Qualitative Disclosures About Market Risk

We are a "smaller reporting company" as defined by Rule 12b-2 of the Exchange Act, and as such, we are not required to provide the disclosure required under this item.

ITEM 8. Financial Statements and Supplementary Data

REPORT OF INDEPENDENT REGISTERED PUBLIC ACCOUNTING FIRM

To the Stockholders and Board of Directors of
ThermoGenesis Holdings, Inc.

Opinion on the Financial Statements

We have audited the accompanying consolidated balance sheets of ThermoGenesis Holdings, Inc. (the "Company") as of December 31, 2022 and 2021, the related consolidated statements of operations and comprehensive loss, equity and cash flows for each of the two years in the period ended December 31, 2022, 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 2021, and the results of its operations and its cash flows for each of the two years in the period ended December 31, 2022, 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 incurred recurring operating losses and needs to raise additional capital to grow its business, fund operating expenses and make interest payments. 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.

Basis for Opinion

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

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

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

Critical Audit Matters

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

Inventory – Excess and Slow-Moving Inventory Reserve

Critical Audit Matter Description

As described in Note 3 to the consolidated financial statements, the Company provides valuation allowances for excess and slow-moving inventory on hand that are not expected to be sold to reduce the carrying amount of slow-moving inventory to its estimated net realizable value. The valuation allowances are based upon estimates about future demand from its customers and distributors and market conditions.

We identified the inventory reserve as a critical audit matter as auditing management's estimate of the excess and slow-moving inventory reserve was subjective and required significant judgment as the excess and slow-moving inventory reserve is sensitive to changes in the Company's operations and assumptions used to estimate the reserve including management's assumptions with regards to projections of future product demand and market conditions, which includes historical usage, expected future usage, and on-hand quantities of individual materials. This in turn led to a high degree of auditor judgment, subjectivity and effort in performing procedures and evaluating management's analysis and significant assumptions related to projections of future demand.

How the Critical Audit Matter Was Addressed in the Audit

Our audit procedures related to the excess and slow-moving inventory reserve included the following, among others:

- We obtained an understanding of the design of controls associated with management's evaluation of excess and slow-moving inventory reserve.
- We tested completeness and accuracy of the underlying data used in developing the estimate for excess and slow-moving inventory reserve.
- We audited management's calculation of the inventory reserve by testing the mathematical accuracy of the Company's reserve calculation.
- We evaluated the appropriateness and consistency of management's methodology and assumptions used in developing their estimate of the excess and slow-moving inventory reserve including consideration of projections of future customer demand, which involved consideration of historical performance of the products.
- We compared actual write-off activity in the current year to the excess and slow-moving reserve estimated by the Company in the prior year to evaluate management's ability to accurately estimate the reserve.
- We looked for indications that the reserve for excess and slow-moving inventory may be understated by evaluating write-off activity of inventory subsequent to December 31, 2022.
- We considered the existence of contradictory evidence based on consideration of internal communication to management and the board of directors, Company press releases, and any changes within the business.

/s/ Marcum LLP

Marcum LLP

We have served as the Company's auditor since 2015.

New York, NY
March 30, 2023

ThermoGenesis Holdings, Inc.
Consolidated Balance Sheets

	December 31, 2022	December 31, 2021
ASSETS		
Current assets:		
Cash and cash equivalents	$ 4,177,000	$ 7,280,000
Accounts receivable, net of allowance for doubtful accounts of $149,000 ($156,000 at December 31, 2021)	1,865,000	733,000
Inventories	3,334,000	5,373,000
Prepaid expenses and other current assets	1,508,000	1,578,000
Total current assets	10,884,000	14,964,000
Inventories, non-current	1,003,000	1,709,000
Equipment and leasehold improvements, net	1,254,000	1,261,000
Right-of-use operating lease assets, net	372,000	571,000
Right-of-use operating lease assets – related party, net	3,550,000	-
Goodwill	781,000	781,000
Intangible assets, net	1,286,000	1,318,000
Other assets	256,000	48,000
Total assets	$ 19,386,000	$ 20,652,000
LIABILITIES AND STOCKHOLDERS' EQUITY		
Current liabilities:		
Accounts payable	$ 820,000	$ 1,280,000
Accrued payroll and related expenses	399,000	348,000
Deferred revenue – short-term	782,000	719,000
Convertible promissory note – related party	5,777,000	-
Interest payable – related party	1,492,000	2,231,000
Convertible promissory note, net	962,000	813,000
Other current liabilities	1,277,000	957,000
Total current liabilities	11,509,000	6,348,000
Convertible promissory note – related party, net	-	9,245,000
Operating lease obligations – long-term	131,000	398,000
Operating lease obligations – related party – long-term	3,495,000	-
Deferred revenue – long-term	911,000	1,244,000
Other noncurrent liabilities	17,000	20,000
Total liabilities	16,063,000	17,255,000
Commitments and contingencies		
Stockholders' equity:		
Preferred stock, $0.001 par value; 2,000,000 shares authorized, none outstanding	-	-
Common stock, $0.001 par value; 350,000,000 shares authorized; 1,037,138 issued and outstanding (279,629 at December 31, 2021)	1,000	-
Additional paid in capital	270,377,000	268,459,000
Accumulated deficit	(266,193,000)	(264,662,000)
Accumulated other comprehensive loss	111,000	31,000
Total ThermoGenesis Holdings, Inc. stockholders' equity	4,296,000	3,828,000
Noncontrolling interests	(973,000)	(431,000)
Total equity	3,323,000	3,397,000
Total liabilities and equity	$ 19,386,000	$ 20,652,000

See accompanying notes to consolidated financial statements.

ThermoGenesis Holdings, Inc.
Consolidated Statements of Operations and Comprehensive Loss

	Years Ended December 31, 2022	2021
Net revenues	$ 10,483,000	$ 9,294,000
Cost of revenues	7,773,000	5,801,000
Gross profit	2,710,000	3,493,000
Expenses:		
Selling, general and administrative	7,244,000	8,515,000
Research and development	1,659,000	2,209,000
Total operating expenses	8,903,000	10,724,000
Loss from operations	(6,193,000)	(7,231,000)
Other income / (expense):		
Interest expense	(5,616,000)	(6,103,000)
Gain on extinguishment of debt	-	652,000
Employee retention tax credit and other income / (expense)	(3,000)	802,000
Total other expense	(5,619,000)	(4,649,000)
Net loss	$ (11,812,000)	$ (11,880,000)
Loss attributable to non-controlling interests	(542,000)	(501,000)
Net loss attributable to common stockholders	$ (11,270,000)	$ (11,379,000)
COMPREHENSIVE LOSS		
Net loss	$ (11,812,000)	$ (11,880,000)
Other comprehensive loss:		
Foreign currency translation adjustments	80,000	15,000
Comprehensive loss	(11,732,000)	(11,865,000)
Comprehensive loss attributable to non-controlling interests	(542,000)	(501,000)
Comprehensive loss attributable to common stockholders	$ (11,190,000)	$ (11,364,000)
Per share data:		
Basic and diluted net loss per common share	$ (20.45)	$ (43.41)
Weighted average common shares outstanding basic and diluted	550,993	262,135

See accompanying notes to consolidated financial statements.

ThermoGenesis Holdings, Inc.
Consolidated Statements of Equity
For the years ended December 31, 2022 and 2021

	Shares	Common Stock	Additional Paid in Capital	Accumulated Deficit	AOCL*	Non-Controlling Interests	Total Equity
Balance at January 1, 2022	279,629	$ -	$ 268,459,000	$ (264,662,000)	$ 31,000	$ (431,000)	$ 3,397,000
Stock-based compensation expense	-	-	267,000	-		-	267,000
Adoption of ASU 2020-06	-	-	(10,681,000)	9,739,000	-	-	(942,000)
Issuance of common stock via at- the-market offering, net	196,843	-	3,037,000	-	-	-	3,037,000
Related party convertible note price reset	-	-	4,635,000	-	-	-	4,635,000
Convertible note price reset	-	-	112,000	-	-	-	112,000
Conversion of related party note payable to common stock	234,495	1,000	2,999,000	-	-	-	3,000,000
Sale of common stock and warrants, net	261,885	-	1,546,000	-	-	-	1,546,000
Exercise of pre-funded warrants	64,286		3,000				3,000
Foreign currency translation gain	-	-	-	-	80,000	-	80,000
Net loss	-	-	-	(11,270,000)	-	(542,000)	(11,812,000)
Balance at December 31, 2022	1,037,138	$ 1,000	$ 270,377,000	$ (266,193,000)	$ 111,000	$ (973,000)	$ 3,323,000

	Shares	Common Stock	Additional Paid in Capital	Accumulated Deficit	AOCL*	Non-Controlling Interests	Total Equity
Balance at January 1, 2021	213,477	$ -	$ 259,067,000	$ (253,283,000)	$ 16,000	$ 70,000	$ 5,870,000
Stock-based compensation expense	-	-	2,560,000	-	-	-	2,560,000
Issuance of common stock via at- the-market offering, net	66,152	-	6,832,000	-	-	-	6,832,000
Foreign currency translation gain	-	-	-	-	15,000	-	15,000
Net loss	-	-	-	(11,379,000)	-	(501,000)	(11,880,000)
Balance at December 31, 2021	279,629	$ -	$ 268,459,000	$ (264,662,000)	$ 31,000	$ (431,000)	$ 3,397,000

*Accumulated other comprehensive loss.

See accompanying notes to consolidated financial statements.

ThermoGenesis Holdings, Inc.
Consolidated Statements of Cash Flows

	Year Ended December 31, 2022	2021
Cash flows from operating activities:		
Net loss	$ (11,812,000)	$ (11,880,000)
Adjustments to reconcile net loss to net cash used in operating activities:		
Depreciation and amortization	926,000	633,000
Stock-based compensation expense	267,000	2,560,000
Amortization of debt discount/premium, net	3,487,000	3,631,000
Reserve for excess and slow-moving inventories	667,000	864,000
Reserve for bad debt expense	2,000	(56,000)
Loss on disposal of equipment	11,000	-
Gain on extinguishment of debt	-	(652,000)
Net change in operating assets and liabilities:		
Accounts receivable	(1,134,000)	703,000
Inventories	2,073,000	(1,031,000)
Prepaid expenses and other assets	(139,000)	(700,000)
Accounts payable	(386,000)	(74,000)
Interest payable - related party	(738,000)	149,000
Accrued payroll and related expenses	51,000	(1,000)
Deferred revenue – short term	63,000	111,000
Other current liabilities	330,000	(323,000)
Long-term deferred revenue and other noncurrent liabilities	(951,000)	(554,000)
Net cash used in operating activities	(7,283,000)	(6,620,000)
Cash flows from investing activities:		
Capital expenditures	(400,000)	(93,000)
Net cash used in investing activities	(400,000)	(93,000)
Cash flows from financing activities:		
Proceeds from sale of common stock and warrants, net	4,583,000	6,832,000
Proceeds from exercise of warrants and pre-funded warrants	3,000	-
Net cash provided by financing activities	4,586,000	6,832,000
Effects of foreign currency rate changes on cash and cash equivalents	(6,000)	-
Net increase (decrease) in cash, cash equivalents and restricted cash	(3,103,000)	119,000
Cash, cash equivalents and restricted cash at beginning of period	7,280,000	7,161,000
Cash, cash equivalents and restricted cash at end of period	$ 4,177,000	$ 7,280,000
Supplemental disclosures of cash flow information:		
Cash paid for interest	$ 180,000	$ 240,000
Cash paid for related party interest	$ 2,628,000	$ 2,139,000
Right-to-use asset acquired under operating lease	$ 3,863,000	$ -
Convertible note price reset	$ 112,000	$ -
Related party convertible note price reset	$ 4,635,000	$ -
Related party promissory note converted to common stock	$ 3,000,000	$ -
Transfer of inventories to equipment	$ -	$ 181,000

See accompanying notes to consolidated financial statements.

ThermoGenesis Holdings, Inc.
Notes to Consolidated Financial Statements

1. Description of Business

The Company develops and commercializes a range of automated technologies for cell-banking, cell-processing, and cell-based therapeutics. Since the 1990's, ThermoGenesis Holdings has been a pioneer in, and a leading provider of automated systems that isolate, purify and cryogenically store units of hematopoietic stem and progenitor cells for the cord blood banking industry. The Company was founded in 1986 and is incorporated in the State of Delaware and headquartered in Rancho Cordova, CA.

Medical Device Products for Automated Cell Processing

The Company provides the AutoXpress® and BioArchive® platforms for automated clinical bio-banking, PXP® platform for point-of-care cell-based therapies and the CAR-TXpress™ platform for large scale cell manufacturing services. All product lines are reporting as a single reporting segment in the financial statements.

Planned CDMO Business

In March 2022, our Board of Directors approved the planned expansion of the Company's business to include contract development and manufacturing services for cell and cell-based gene therapies. The Company plans to develop and build-out the capabilities to become a Contract Development and Manufacturing Organization ("CDMO") for cell and cell-based gene therapies by partnering with Boyalife Genomics Tianjin Ltd., a China-based CDMO ("Boyalife Genomics"), to in-license certain know-how and other intellectual property from Boyalife Genomics, and by leasing and building out a cell manufacturing facility in Sacramento, California. We intend to leverage our existing technology and combine it with the in-licensed technologies to develop a proprietary manufacturing platform for cell manufacturing activities and other cell manufacturing solutions for clients with therapeutic candidates in various stages of development.

Our common stock is traded on the Nasdaq Capital Market exchange under the ticker symbol "THMO".

2. Going Concern

At December 31, 2022, the Company had cash and cash equivalents of $4,177,000 and negative working capital of $625,000. The Company has incurred historical losses from operations and expects to continue to incur operating losses in the near future. The Company may need to raise additional capital to grow its business, fund operating expenses and make interest payments. The Company's ability to fund its liquidity needs is subject to various risks, many of which are beyond its control. The Company may seek additional funding through debt borrowings, sales of debt or equity securities or strategic partnerships. The Company cannot guarantee that such funding will be available on a timely basis, in needed quantities or on terms favorable to the Company, if at all. These factors and other indicators raise substantial doubt about the Company's ability to continue as a going concern within one year from the filing date of this report.

The accompanying consolidated financial statements have been prepared assuming that the Company will continue as a going concern. The 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 should the Company be unable to continue as a going concern.

3. Summary of Significant Accounting Policies

Basis of Presentation

The accompanying consolidated financial statements have been prepared in accordance with accounting principles generally accepted in the United States of America (U.S. GAAP).

Reverse Stock Split

On December 22, 2022, the Company effected a one (1) for forty-five (45) reverse stock split of its issued and outstanding common stock. The total number of shares of common stock authorized for issuance by the Company of 350,000,000 shares did not change in connection with the reverse stock split.

All historical share amounts disclosed herein have been retroactively restated to reflect the reverse split and subsequent share exchange. No fractional shares were issued as a result of the reverse stock split, as fractional shares of common stock were rounded up to the nearest whole share.

Principles of Consolidation

The consolidated financial statements include the accounts of ThermoGenesis Holdings, Inc. and its wholly-owned subsidiaries, ThermoGenesis Corp. and TotipotentRX Cell Therapy, Pvt. Ltd and ThermoGenesis Corp's majority-owned subsidiary, CARTXpress Bio. All significant intercompany accounts and transactions have been eliminated upon consolidation.

Non-controlling Interests

The 20% ownership interest of CARTXpress Bio that is not owned by ThermoGenesis Holdings is accounted for as a non-controlling interest as the Company has an 80% ownership interest in CARTXpress Bio. Earnings or losses attributable to other stockholders of a consolidated affiliated company are classified separately as "non-controlling interest" in the Company's consolidated statements of operations. Net loss attributable to non-controlling interests reflects only its share of the after-tax earnings or losses of an affiliated company. The Company's consolidated balance sheets reflect non-controlling interests within the equity section.

Use of Estimates

Preparation of financial statements in conformity with accounting principles generally accepted in the United States of America ("GAAP") and requires management to make estimates and assumptions that affect the reported amounts of assets and liabilities at the date of the consolidated financial statements and the reported amounts of revenues and expenses during the reporting period. Estimates are used for, but not limited to, the allowance for doubtful accounts, carrying amounts of inventories, depreciation and amortization, warranty obligations, assumptions made in valuing financial instruments issued in various compensation and financing arrangements, deferred income taxes and related valuation allowance and the fair values of intangibles and goodwill. Actual results could materially differ from the estimates and assumptions used in the preparation of the Company's consolidated financial statements.

Revenue Recognition

Revenue is recognized based on the following five-step process as outlined in the Accounting Standards Codification ("ASC") Topic 606, "Revenue from Contracts with Customers": (i) Identify the Contract with the Customer; (ii) Identify Performance Obligations in the Contract; (iii) Determine the Transaction Price; (iv) Allocate the Transaction Price; and (v) Satisfaction of the Performance Obligations (and Recognize Revenue). Revenues are recorded net of discounts. Shipping and handling fees billed to customers are included in net revenues, while the related costs are included in cost of revenues. For more information on revenues, see *Note 12*.

Cash and Cash Equivalents

The Company considers all highly liquid investments with a maturity of three months or less at the time of purchase to be cash equivalents. Financial instruments that potentially subject the Company to a concentration of credit risk consist of cash and cash equivalents. The Company's cash and cash equivalents is maintained in checking accounts with reputable financial institutions that may at times exceed amounts covered by insurance provided by the U.S. Federal Deposit Insurance Corporation ("FDIC"). The Company has cash and cash equivalents of $47,000 and $87,000 at December 31, 2022 and 2021 in India. The Company has not experienced any realized losses on the Company's deposits of cash and cash equivalents.

Foreign Currency Translation

The Company's reporting currency is the US dollar. The functional currency of the Company's subsidiary in India is the Indian rupee ("INR"). Assets and liabilities are translated into US dollars at period end exchange rates. Revenue and expenses are translated at average rates of exchange prevailing during the periods presented. Cash flows are also translated at average exchange rates for the period, therefore, amounts reported on the consolidated statement of cash flows do not necessarily agree with changes in the corresponding balances on the consolidated balance sheet. Equity accounts other than retained earnings are translated at the historic exchange rate on the date of investment.

Goodwill, Intangible Assets and Impairment Assessments

Goodwill represents the excess of the purchase price in a business combination over the fair value of net tangible and intangible assets acquired. Intangible assets that are not considered to have an indefinite useful life are amortized over their useful lives, which generally range from three to ten years. Each period the Company evaluates the estimated remaining useful lives of purchased intangible assets and whether events or changes in circumstances warrant a revision to the remaining periods of amortization.

For goodwill and indefinite-lived intangible assets, the carrying amounts are periodically reviewed for impairment (at least annually) and whenever events or changes in circumstances indicate that the carrying value of these assets may not be recoverable. According to ASC 350, "*Intangibles-Goodwill and Other*", the Company can opt to perform a qualitative assessment or a quantitative assessment; however, if the qualitative assessment determines that it is more likely than not (i.e., a likelihood of more than 50 percent) the fair value is less than the carrying amount; the Company would recognize an impairment charge for the amount by which the carrying amount exceeds the reporting unit's fair value.

Fair Value of Financial Instruments

In accordance with ASC 820, *Fair Value Measurements and Disclosures*, fair value is defined as the exit price, or the amount that would be received for the sale of an asset or paid to transfer a liability in an orderly transaction between market participants as of the measurement date.

The guidance also establishes a hierarchy for inputs used in measuring fair value that maximizes the use of observable inputs and minimizes the use of unobservable inputs by requiring that the most observable inputs be used when available. Observable inputs are inputs that market participants would use in valuing the asset or liability and are developed based on market data obtained from sources independent of the Company. Unobservable inputs are inputs that reflect the Company's assumptions about the factors that market participants would use in valuing the asset or liability. The guidance establishes three levels of inputs that may be used to measure fair value:

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

Level 2: Other observable inputs other than Level 1 prices such as quoted prices for similar assets or liabilities; quoted prices in markets that are not active; or other inputs that are observable or can be corroborated by observable market data.

Level 3: Unobservable inputs reflecting the reporting entity's own assumptions.

The carrying values of cash and cash equivalents, accounts receivable and accounts payable approximate fair value due to their short duration.

Accounts Receivable and Allowance for Doubtful Accounts

The Company's receivables are recorded when billed and represent claims against third parties that will be settled in cash. The carrying value of the Company's receivables, net of the allowance for doubtful accounts, represents their estimated net realizable value. The Company estimates the allowance for doubtful accounts based on historical collection trends, age of outstanding receivables and existing economic conditions. If events or changes in circumstances indicate that a specific receivable balance may be impaired, further consideration is given to the collectability of those balances and the allowance is adjusted accordingly. A customer's receivable balance is considered past-due based on its contractual terms. Past-due receivable balances are written-off when the Company's internal collection efforts have been unsuccessful in collecting the amount due.

Inventories

Inventories are stated at the lower of cost or net realizable value and include the cost of material, labor and manufacturing overhead. Cost is determined on a first-in, first-out basis. The Company writes-down inventory to its estimated net realizable value when conditions indicate that the selling price could be less than cost due to physical deterioration, obsolescence, changes in price levels, or other causes, which it includes as a component of cost of revenues. Additionally, the Company provides valuation allowances for excess and slow-moving inventory on hand that are not expected to be sold to reduce the carrying amount of slow-moving inventory to its estimated net realizable value. The valuation allowances are based upon estimates about future demand from its customers, distributors and market conditions.

At times, the Company will purchase inventories in larger quantities to obtain volume purchase discounts. In some cases, purchases may exceed expected sales for certain products in the following year. If the Company purchases inventory which is likely to not be sold in the next year, that inventory is classified as non-current. As of December 31, 2022 and December 31, 2021, the Company had $1,003,000 and $1,709,000, respectively of non-current inventory.

Equipment and Leasehold Improvements, Net

Equipment consisting of machinery and equipment, computers and software, office equipment and leasehold improvements is recorded at cost less accumulated depreciation. Repairs and maintenance costs are expensed as incurred. Depreciation for machinery and equipment, computers and software and office furniture are computed under the straight-line method over the estimated useful lives. Leasehold improvements are amortized under the straight-line method over their estimated useful lives or the remaining lease period, whichever is shorter. When equipment and leasehold improvements are sold or otherwise disposed of, the asset account and related accumulated depreciation account are relieved, and the impact of any resulting gain or loss is recognized within general and administrative expenses in the consolidated statement of operations for the period.

Warranty

We provide for the estimated cost of product warranties at the time revenue is recognized. While we engage in extensive product quality programs and processes, including actively monitoring and evaluating the quality of our component suppliers, our warranty obligation is affected by product failure rates, material usage and service delivery costs incurred in correcting a product failure. Should actual product failure rates, material usage or service delivery costs differ from our estimates, revisions to the estimated warranty liability could have a material impact on our financial position, cash flows or results of operations.

Debt Discount and Issue Costs

The Company amortizes debt discount and debt issue costs over the life of the associated debt instrument, using the straight-line method which approximates the interest rate method.

Stock-Based Compensation

We use the Black-Scholes-Merton option-pricing formula in determining the fair value of our options at the grant date and apply judgment in estimating the key assumptions that are critical to the model such as the expected term, volatility and forfeiture rate of an option. Our estimate of these key assumptions is based on historical information and judgment regarding market factors and trends. If any of the key assumptions change significantly, stock-based compensation expense for new awards may differ materially in the future from that recorded in the current period. The compensation expense is then amortized over the vesting period.

The Company has three stock-based compensation plans, which are described more fully in *Note 11*.

Valuation and Amortization Method – The Company estimates the fair value of stock options granted using the Black-Scholes-Merton option-pricing formula. This fair value is then amortized on a straight-line basis over the requisite service periods of the awards, which is generally the vesting period. The formula does not include a discount for post-vesting restrictions, as we have not issued awards with such restrictions.

Expected Term – For options which the Company has limited available data, the expected term of the option is based on the simplified method. This simplified method averages an award’s vesting term and its contractual term. For all other options, the Company's expected term represents the period that the Company's stock-based awards are expected to be outstanding and was determined based on historical experience of similar awards, giving consideration to the contractual terms of the stock-based awards, vesting schedules and expectations of future employee behavior.

Expected Volatility – Expected volatility is based on historical volatility. Historical volatility is computed using daily pricing observations for recent periods that correspond to the expected term of the options.

Expected Dividend – The Company has not declared dividends and does not anticipate declaring any dividends in the foreseeable future. Therefore, the Company uses a zero value for the expected dividend value factor to determine the fair value of options granted.

Risk-Free Interest Rate – The Company bases the risk-free interest rate used in the valuation method on the implied yield currently available on U.S. Treasury zero-coupon issues with the same expected term.

Estimated Forfeitures – When estimating forfeitures, the Company considers voluntary and involuntary termination behavior as well as analysis of actual option forfeitures.

Research and Development

Research and development costs, consisting of salaries and benefits, costs of disposables, facility costs, contracted services and stock-based compensation from the engineering, regulatory and scientific affairs departments, that are useful in developing and clinically testing new products, services, processes or techniques, as well as expenses for activities that may significantly improve existing products or processes are expensed as incurred. Costs to acquire technologies that are utilized in research and development and that have no future benefit are expensed when incurred.

Acquired In-Process Research and Development

Acquired in-process research and development that the Company acquires through business combinations represents the fair value assigned to incomplete research projects which, at the time of acquisition, have not reached technological feasibility. The amounts are capitalized and are accounted for as indefinite-lived intangible assets, subject to impairment testing until completion or abandonment of the projects. Upon successful completion of each project, the Company will make a determination as to the then useful life of the intangible asset, generally determined by the period in which the substantial majority of the cash flows are expected to be generated and begin amortization. The Company tests intangible assets for impairment at least annually, or more frequently if impairment indicators exist, by first assessing qualitative factors to determine whether it is more likely than not that the fair value of the intangible asset is less than it's carrying amount. If the Company concludes it is more likely than not that the fair value is less than the carrying amount, a quantitative test that compares the fair value of the intangible asset with its' carrying value is performed. If the fair value is less than the carrying amount, an impairment loss is recognized in operating results.

Patent Costs

The costs incurred in connection with patent applications, in defending and maintaining intellectual property rights and litigation proceedings are expensed as incurred.

Credit Risk

Currently, the Company primarily manufactures and sells cellular processing systems and thermodynamic devices principally to the blood and cellular component processing industry and performs ongoing evaluations of the credit worthiness of the Company's customers. The Company believes that adequate provisions for uncollectible accounts have been made in the accompanying consolidated financial statements. To date, the Company has not experienced significant credit related losses.

Income Taxes

The tax years 2003-2021 remain open to examination by the major taxing jurisdictions to which the Company is subject; however, there is no current examination. The Company's policy is to recognize interest and penalties related to the underpayment of income taxes as a component of income tax expense. To date, there have been no interest or penalties charged to the Company in relation to the underpayment of income taxes. There were no unrecognized tax benefits during the periods presented.

The Company's estimates of income taxes and the significant items resulting in the recognition of deferred tax assets and liabilities reflect the Company's assessment of future tax consequences of transactions that have been reflected in the financial statements or tax returns for each taxing jurisdiction in which the Company operates. The Company bases the provision for income taxes on the Company's current period results of operations, changes in deferred income tax assets and liabilities, income tax rates, and changes in estimates of uncertain tax positions in the jurisdictions in which the Company operates. The Company recognizes deferred tax assets and liabilities when there are temporary differences between the financial reporting basis and tax basis of assets and liabilities and for the expected benefits of using net operating loss and tax credit loss carryforwards. The Company establishes valuation allowances when necessary to reduce the carrying amount of deferred income tax assets to the amounts that the Company believes are more likely than not to be realized. The Company evaluates the need to retain all or a portion of the valuation allowance on recorded deferred tax assets. When a change in the tax rate or tax law has an impact on deferred taxes, the differences are expected to reverse. As the Company operates in more than one state, changes in the state apportionment factors, based on operational results, may affect future effective tax rates and the value of recorded deferred tax assets and liabilities. The Company records a change in tax rates in the consolidated financial statements in the period of enactment.

Income tax consequences that arise in connection with a business combination include identifying the tax basis of assets and liabilities acquired and any contingencies associated with uncertain tax positions assumed or resulting from the business combination. Deferred tax assets and liabilities related to temporary differences of an acquired entity are recorded as of the date of the business combination and are based on the Company's estimate of the appropriate tax basis that will be accepted by the various taxing authorities and its determination as to whether any of the acquired deferred tax liabilities could be a source of taxable income to realize the Company's pre-existing deferred tax assets.

Reclassifications

Certain prior period amounts have been reclassified to conform to the current period presentation. The reclassifications did not have an impact on net loss as previously reported. As a result of the reverse stock split effected by the Company on December 22, 2022, common stock and additional paid in capital amounts from prior periods were adjusted as to reflect if the reverse split had occurred in the prior periods.

Recently Adopted Accounting Standards

On January 1, 2022, *we adopted Accounting Standards Update ("ASU") 2020-06 "Debt-Debt with Conversion and Other Options ("Subtopic 470-20") and Derivatives and Hedging-Contracts in Entity's Own Equity ("Subtopic 815-40"): Accounting for Convertible Instruments and Contracts in an Entity's Own Equity," using the modified retrospective method.* ASU 2020-06 provides guidance on how to account for contracts on an entity's own equity. This ASU simplifies the accounting for certain financial instruments with characteristics of liabilities and equity, including convertible instruments and contracts on an entity's own equity. Specifically, the ASU eliminated the need for the Company to assess whether a contract on the entity's own equity (1) permits settlement in unregistered shares, (2) whether counterparty rights rank higher than shareholder's rights, and (3) whether collateral is required. The Company recognized a cumulative effect of $9,739,000 of initially applying the ASU as an adjustment to the January 1, 2022 opening balance of accumulated deficit. Due to the recombination of the equity conversion component of our convertible debt outstanding, the 2022 opening balance of additional paid in capital was reduced by $10,681,000 and the debt discounts of the convertible promissory notes were reduced $942,000.

Recently Issued Accounting Standards

In June 2016, the FASB issued *ASU 2016-13, Financial Instruments - Credit Losses ("Topic 326").* The ASU introduced a new accounting model, the Current Expected Credit Losses model ("CECL"), which requires earlier recognition of credit losses and additional disclosures related to credit risk. The CECL model utilizes a lifetime expected credit loss measurement objective for the recognition of credit losses at the time the financial asset is originated or acquired. ASU 2016-13 is effective for annual reporting periods beginning after December 15, 2022, including interim reporting periods within those annual reporting periods. The Company is in the process of assessing the impact of the adoption of the ASU on the Company's financial statements.

4. Equipment and Leasehold Improvements

Equipment and leasehold improvements consisted of the following:

	Year Ended December 31,		
	2022	2021	Estimated Useful Life (in years)
Machinery and equipment[1]	$ 6,610,000	$ 6,270,000	2.5 - 10
Computer and software	631,000	631,000	2 - 5
Office equipment	256,000	256,000	5 - 10
Leasehold improvements	932,000	932,000	5 years or remaining lease term
Total equipment	8,429,000	8,089,000	
Less accumulated depreciation	(7,175,000)	(6,828,000)	
Total equipment and leasehold improvements, net	$ 1,254,000	$ 1,261,000	

(1) Includes $391,000 and $140,000 for cost related to construction in progress for the years ended December 31, 2022 and 2021, respectively.

Depreciation expense for the years ended December 31, 2022 and 2021 was $387,000 and $429,000, respectively.

5. Intangible Assets and Goodwill

In 2022, in accordance with ASC 350, the Company performed a qualitative analysis, which determined that it was not more likely than not that the fair value of the reporting units or the fair value of the intangible assets was less than the carrying value of the goodwill and intangible assets recorded on the Company's books as of December 31, 2022. As a result, no impairment was recorded and a quantitative analysis was not performed. In performing the assessment, the Company used current market capitalization, discounted future cash flows, internal forecasts and other factors as the best evidence of fair value. These assumptions represent Level 3 inputs.

	Intangible Assets	Goodwill
Balance at January 1, 2021, net	$ 1,358,000	$ 781,000
Amortization and foreign exchange	(40,000)	-
Balance at December 31, 2021, net	$ 1,318,000	$ 781,000
Amortization and foreign exchange	(32,000)	-
Balance at December 31, 2022, net	$ 1,286,000	$ 781,000

Intangible assets consist of the following based on the Company's determination of the fair value of identifiable assets acquired:

	As of December 31, 2022			
	Weighted Average Amortization Period (in Years)	Gross Carrying Amount	Accumulated Amortization	Net
Trade names	3	$ 49,000	$ (49,000)	$ -
Developed technology	10	318,000	(175,000)	143,000
Licenses	7	377,000	(377,000)	-
Device registration	7	71,000	(71,000)	-
Customer relationships	3	387,000	(387,000)	-
Amortizable intangible assets		$ 1,202,000	$ (1,059,000)	$ 143,000
In process technology		1,143,000	-	1,143,000
Total		$ 2,345,000	$ (1,059,000)	$ 1,286,000

	As of December 31, 2021			
	Weighted Average Amortization Period (in Years)	Gross Carrying Amount	Accumulated Amortization	Net
Trade names	3	$ 52,000	$ (52,000)	$ -
Developed technology	10	318,000	(143,000)	175,000
Licenses	7	418,000	(418,000)	-
Device registration	7	78,000	(78,000)	-
Customer relationships	3	425,000	(425,000)	-
Amortizable intangible assets		$ 1,291,000	$ (1,116,000)	$ 175,000
In process technology		1,143,000	--	1,143,000
Total		$ 2,434,000	$ (1,116,000)	$ 1,318,000

The change in the gross carrying amount is due to foreign currency exchange fluctuations. In process technology has not yet been introduced to the market place and is therefore not yet subject to amortization. The Company's estimated future amortization expense for amortizable intangible assets in subsequent years, are as follows:

Year Ended December 31,	
2023	$ 32,000
2024	32,000
2025	32,000
2026	32,000
2027	15,000
Total	$ 143,000

6. Related Party Transactions

HealthBanks Biotech (USA) Inc.

On November 26, 2019, the Company entered into an agreement with HealthBanks Biotech (USA) Inc. ("HealthBanks") to form a new company called ImmuneCyte, Inc. ("ImmuneCyte") to commercialize the Company's proprietary cell processing platform, CAR-TXpress™, for use in immune cell banking as well as for cell-based contract development and manufacturing services (CMO/CDMO). Under the terms of the agreement, ImmuneCyte was initially owned 80% by HealthBanks and 20% by the Company. Healthbanks is a subsidiary of the Boyalife Group (USA), Inc. which is owned by Dr. Xiaochun (Chris) Xu, the Company's Chief Executive Officer and Chairman of our Board of Directors. Due to the significant influence the Company has over ImmuneCyte's operations, the investment was accounted for by the Company using the equity method.

Between November 26, 2019 and September 30, 2020, ImmuneCyte closed on a series of investments with a private institution and qualified investors. After the investments, ImmuneCyte was owned 75.16% by HealthBanks, 18.79% by the Company and 6.05% by the private investors.

In March 2021, ImmuneCyte completed an acquisition to acquire Boyalife's Cellular Therapy Division, for 12,000,000 shares in ImmuneCyte and Shanghai KDW info Technology Co. Ltd. for 500,000 shares in ImmuneCyte. Following the acquisitions, the Company's ownership percentage in ImmuneCyte decreased from 18.79% to 8.64%. The Company performed an analysis of the transaction and noted that none of the factors supporting significant influence changed as a result of the acquisition. Therefore, it was concluded that significant influence remains and the Company will continue to account for the transaction using the equity method. The Company recognized a dilution gain of $262,000 representing its share of the net assets acquired by ImmuneCyte. However, at the time of the acquisition, the Company had accumulated losses of $428,000 in its investment in ImmuneCyte. As the accumulated losses were greater than the dilution gain, no entry was recorded by the Company for its investment in ImmuneCyte following the transaction.

Boyalife Genomics

On March 24, 2022, the Company entered into a License and Technology Access Agreement with Boyalife Genomics Tianjin Ltd. ("Boyalife Genomics"), a China-based CDMO and an affiliate of ThermoGenesis' Chairman and Chief Executive Officer, Chris Xu, Ph.D. The agreement provides for a U.S. license to certain existing and future know-how and other intellectual property relating to cell manufacturing and related processes. The Company plans to develop and operate the CDMO cell therapy manufacturing business through a newly formed division named TG Biosynthesis.

Under the terms of the agreement, the Company transferred its remaining 8.64% interest in ImmuneCyte to Boyalife Genomics and agreed to pay a running royalty of 7.5% of its annual net sales of products and services that are covered by one or more of Boyalife Genomics' granted U.S. patents and a royalty of 5.0% of other products and services covered by other licensed intellectual property. In the year ended December 31, 2022, no sales were recorded under the license agreement and no royalty payments were made to Boyalife Genomics.

Convertible Promissory Note and Revolving Credit Agreement

In March 2017, ThermoGenesis Holdings entered into a Credit Agreement with Boyalife Group (USA) (the "Lender"), which is owned and controlled by the Company's Chief Executive Officer and Chairman of our Board of Directors. The Credit Agreement, as amended, grants to the Company the right to borrow up to $10,000,000 (the "Loan") at any time prior to March 6, 2023 (the "Maturity Date"). In June 2022, the Lender converted a total of $3,000,000 of the outstanding balance of the convertible note into 10,552,234 shares of our common stock. As of December 31, 2022, the Company had an outstanding principal balance on the Loan of $7,000,000.

The Credit Agreement and the Convertible Promissory Note issued thereunder (as amended, the "Note") provide that the principal and all accrued and unpaid interest under the Loan will be due and payable on the Maturity Date, with payments of interest-only due on the last day of each calendar year. The Loan bears interest at 22% per annum, simple interest. The Company has five business days after the Lender demands payment to pay the interest due before the Loan is considered in default. The Loan can be prepaid in whole or in part by the Company at any time without penalty.

The following summarizes the Note:

	Maturity Date	Stated Interest Rate	Conversion Price	Face Value	Debt Discount	Carrying Value
At December 31, 2022	12/31/2023	22%	$ 6.30	$ 7,000,000	$ (1,223,000)	$ 5,777,000
At December 31, 2021	3/6/2022	22%	$ 81.00	$ 10,000,000	$ (755,000)	$ 9,245,000

The Credit Agreement includes a down-round provision that lowers the conversion price of the Note if the Company issues shares of common stock at a lower price per share. In 2022, the anti-dilution provision was triggered four times, as noted below:

In February 2022, when the conversion price of the Note was at $81.00 per share, the Company sold shares of common stock at $28.80 per share. This resulted in a triggering event lowering the conversion price of the Note to that value. The Company determined that it created an incremental value of $213,000 which was treated as a debt discount and amortized over the remaining term of the Note.

In June 2022, the Company sold shares of common stock at $12.60 per share, resulting in a down round triggering event lowering the conversion price of the Note to that value. The triggering event created an incremental value of $2,475,000 which was treated as a debt discount and will be amortized over the remaining term of the Note.

In July 2022, the Company modified a convertible debt agreement, lowering the conversion price of the debt to $9.45 per share, resulting in a down round triggering event lowering the conversion price of the Note to that value. The triggering event created an incremental value of $1,075,000 which was treated as a debt discount and will be amortized over the remaining term of the Note.

In October 2022, the Company sold shares of common stock at $6.30 per share, resulting in a down round triggering event lowering the conversion price of the Note to that value. The triggering event created an incremental value of $872,000 which was treated as a debt discount and will be amortized over the remaining term of the Note.

Subsequent to December 31, 2022, the Company entered into an Amendment No. 2 (the “Amendment to Note”) to its Second Amended and Restated Convertible Promissory Note with Boyalife Group Inc. (the “Note”), and an Amendment No. 3 (the “Amendment to Credit Agreement”) to its First Amended and Restated Revolving Credit Agreement with Boyalife Group Inc. (the “Credit Agreement”). The Amendment to Note amends and extends the maturity date of the Note from March 6, 2023 to December 31, 2023, and provides that interest accrued and unpaid as of March 6, 2023 will be added to the principal balance of the Note.

A Black-Scholes pricing model was utilized to determine the change in the before and after incremental value of the conversion option at each triggering event, with the following inputs:

	February 2022	June 2022	July 2022	October 2022
Conversion price before	$ 81.00	$ 28.80	$ 12.60	$ 9.45
Conversion price after	$ 28.80	$ 12.60	$ 9.45	$ 6.30
Term (years)	0.02	0.69	0.61	0.35
Volatility	39.53%	85.6%	99.5%	165%
Dividend rate	0%	0%	0%	0%
Risk free rate	1.97%	3.2%	2.8%	4.02%

The Company amortized a debt discount of $3,413,000 and $3,310,000 for the years ended December 31, 2022 and 2021, respectively. The debt discount for the period ended December 31, 2022 related to down round triggering events that occurred during the year. The amortization included $742,000, which related to accelerated amortization for the portion of the Note that was converted in June 2022. In addition to the amortization, the Company also recorded interest expense of $1,890,000 and $2,231,000 for the years ended December 31, 2022 and 2021, respectively. The interest payable balance as of December 31, 2022 and December 31, 2021 was $1,492,000 and $2,231,000, respectively.

7. Convertible Promissory Note

July* 2019 *Note

On July 23, 2019, the Company entered into a private placement with the accredited investor, pursuant to which the Company issued and sold to such investor an unsecured convertible promissory note in the original principal amount of $1,000,000 (the "July 2019 Note"). The July 2019 Note is convertible into shares of the Company's common stock at a conversion price equal to the lower of (a) $81.00 per share or (b) 90% of the closing sale price of the Company's common stock on the date of conversion (subject to a floor conversion price of $22.50). The July 2019 Note bears interest at the rate of twenty-four percent (24%) per annum and is payable quarterly in arrears. Unless sooner converted in the manner described below, all principal under the July 2019 Note, together with all accrued and unpaid interest thereupon, will be due and payable three years from the date of the issuance on July 31, 2022.

On July 25, 2022, the Company entered into an amendment to the July 2019 Note, which extended the maturity date of the July 2019 Note to January 31, 2023 and modified when interest is due from quarterly to January 31, 2023. The amendment also (i) deleted the market price-based conversion right, which previously allowed for the July 2019 Note to be converted at a conversion price of 90% of the Company's stock price on the day of conversion (subject to a $22.50 floor); and (ii) changed to a fixed conversion price to $9.45 per share, provided that in the event that the Company issues shares, options, warrants, or convertible securities, at an effective price per common share lower than $9.45, then the conversion price will be adjusted to such lower issuance price.

The Company performed a debt extinguishment vs. modification analysis on the amendment to the July 2019 Note and determined that the extension would be considered an extinguishment, due to an increase of more than 10% to the value of the embedded conversion option. No gain or loss was recorded in the consolidated statement of operations for the year ended December 31, 2022 as it was determined that the fair value of the amendment of the July 2019 Note and accrued interest was the same before and after the extension.

In October 2022, the Company sold shares of common stock at $6.30 per share, resulting in a down round triggering event lowering the conversion price of the Note to that value. The triggering event created an incremental value of $112,000 which was treated as a debt discount and will be amortized over the remaining term of the Note.

Subsequent to December 31, 2022, the Company entered into an Amendment No. 3 to the July 2019 Note with Orbrex (USA) Co. Limited (the "July 2019 Note Amendment"). The July 2019 Note Amendment amends the July 2019 Note, dated July 23, 2019, as amended by Amendment No. 1 dated effective July 23, 2019, and Amendment No. 2 dated July 25, 2022, between the Company and Orbrex (USA) Co. Limited. The July 2019 Note Amendment extends the maturity date of the July 2019 Note from January 31, 2023 to July 31, 2023. The Note Amendment also changed the fixed conversion price to $2.87 per share, provided that in the event that the Company issues shares, options, warrants, or convertible securities, subject to certain exceptions, at an effective price per common share lower than $2.87, then the conversion price will be adjusted to such lower issuance price.

The following summarizes the July 2019 Note:

	Maturity Date	Stated Interest Rate	Conversion Price	Face Value	Debt Discount	Carrying Value
At December 31, 2022	7/31/2023	24%	$ 6.30	$ 1,000,000	$ (38,000)	$ 962,000
At December 31, 2021	7/31/2022	24%	$ 40.95	$ 1,000,000	$ (187,000)	$ 813,000

The Company amortized a debt discount on the July 2019 Note of $74,000 and $321,000 for the years ended December 31, 2022 and 2021, respectively. The debt discount for the period ended December 31, 2022 related to a down round triggering event that occurred during the year. Interest expense related to the July 2019 Note was $240,000 for the years ended December 31, 2022 and 2021. The interest payable balance as of December 31, 2022 and 2021 was $120,000 and $60,000, respectively.

8. Related Party Lease

Z3 Investment

On March 24, 2022, the Company entered into a five year Lease Agreement with Z3 Investment LLC, an affiliate of the Company's Chairman and CEO, and COO, beginning April 1, 2022, for approximately 35,000 square feet of laboratory and office space in Rancho Cordova, California. Under the terms of the agreement, monthly rent is $46,000 per month for the first six months, then increasing to $104,000 per month (with a 4% annual increase) thereafter. Additionally, the Company will pay all operating expenses as they become due estimated to be approximately $5,000 per month and will be expensed in the period incurred. The Company has the option to renew the lease for two 5-year periods. Additionally, the Company has the ability to opt out of the lease after one year if the CDMO facility is unable to be constructed as planned.

The Company performed an analysis of the lease and determined it to be an operating lease. A right-of-use asset and lease obligation were recorded at inception of the lease.

Operating Lease

Operating lease assets and liabilities are recognized at the lease commencement date. Operating lease liabilities represent the present value of lease payments not yet paid. Operating lease assets represent our right to use an underlying asset and are based upon the operating lease liabilities adjusted for prepayments or accrued lease payments, initial direct costs, lease incentives, and impairment of operating lease assets. To determine the present value of lease payments not yet paid, we use the Company's cost of capital based on existing debt instruments. We recognize the expense for this lease on a straight-line basis over the lease term.

The following summarizes the Company's operating lease:

	December 31, 2022
Right-of-use operating lease assets – related party, net	$ 3,550,000
Current lease liability (included in other current liabilities)	433,000
Non-current lease liability – related party	3,495,000
Weighted average remaining lease term	4.8
Discount rate	22%

Maturities of lease liabilities by year for our operating lease are as follows:

2023	$ 1,256,000
2024	1,307,000
2025	1,359,000
2026	1,428,000
2027	1,133,000
Total lease payments	$ 6,483,000
Less: imputed interest	(2,555,000)
Present value of operating lease liabilities	$ 3,928,000

Operating Lease Costs

Lease costs recognized in consolidated statements of operations are summarized below:

	December 31, 2022
Operating lease cost	$ 964,000
Variable lease cost	71,000
Total lease cost	$ 1,035,000

Statement of Cash Flows

Cash paid for amounts included in the measurement of operating lease liabilities was $587,000 for the year ended December 31, 2022.

9. Leases

The Company leases an approximately 28,000 square foot facility located in Rancho Cordova, California for its corporate offices and in-house manufacturing. The lease was renewed in the first quarter of 2019 and is accounted for as an operating lease. The lease expires in May 2024.

Operating Leases

Operating lease assets and liabilities are recognized at the lease commencement date. Operating lease liabilities represent the present value of lease payments not yet paid. Operating lease assets represent our right to use an underlying asset and are based upon the operating lease liabilities adjusted for prepayments or accrued lease payments, initial direct costs, lease incentives, and impairment of operating lease assets. To determine the present value of lease payments not yet paid, we use the Company's cost of capital based on existing debt instruments. Our material leases typically contain rent escalations over the lease term. We recognize expense for these leases on a straight-line basis over the lease term.

The following summarizes the Company's operating leases:

	December 31, 2022	December 31, 2021
Right-of-use operating lease assets, net	$ 372,000	$ 571,000
Current lease liability (included in other current liabilities)	267,000	206,000
Non-current lease liability	131,000	398,000
Weighted average remaining lease term	1.4	2.4
Discount rate	22%	22%

Maturities of lease liabilities by year for our operating leases are as follows:

2023	$ 329,000
2024	139,000
Total lease payments	$ 468,000
Less: imputed interest	(70,000)
Present value of operating lease liabilities	$ 398,000

Operating Lease Costs

Lease costs recognized in consolidated statements of operations are summarized below:

	December 31,	
	2022	2021
Operating lease cost	$ 311,000	$ 311,000
Variable lease cost	111,000	105,000
Total lease cost	$ 422,000	$ 416,000

Statement of Cash Flows

In January 2019, the Company signed an amendment to its Rancho Cordova, California lease. The amendment was accounted for as a modification and resulted in a right-of-use asset of $966,000 being recognized as a non-cash addition on the date of the amendment. Cash paid for amounts included in the measurement of operating lease liabilities in cash flows from operating activities were $319,000 and $310,000 for the years ended December 31, 2022 and 2021, respectively.

Finance Leases

Finance leases are included in equipment and other current and non-current liabilities on the consolidated balance sheet. The amortization and interest expense are included in general and administrative expense and interest expense, respectively on the statement of operations. These leases were not material for the years ended December 31, 2022 and 2021.

10. Commitments and Contingences

Financial Covenants

On July 13, 2020, the Company, entered into a Manufacturing and Supply Amending Agreement #2 with CBR Systems, Inc. (“CBR”) with an effective date of July 13, 2020 (the “Amendment”). The Amendment amends the Manufacturing and Supply Agreement entered into on May 15, 2017 and Amendment #1 dated March 16, 2020 by the Company and CBR. The Amendment, among other things, revised the amounts of certain products to be purchased, pricing of those products and removal of the safety stock requirement. In addition, the Amendment updated the financial requirement to exclude convertible debt from the definition of short-term debt under events or conditions that constitute a default. The Amendment states that the Company’s cash balance and short-term investments net of non-convertible debt and borrowed funds that are payable within one year must be greater than $1,000,000 at any month end. The Company was in compliance with this agreement as of December 31, 2022.

Potential Severance Payments

We have entered into an employment agreement with the Company Chief Executive Officer under which payment and benefits would become payable in the event of termination by us for any reason other than cause, or upon a change in control of our Company, or by the employee for good reason.

Contingencies

In the normal course of operations, the Company may have disagreements or disputes with customers, employees or vendors. Such potential disputes are seen by management as a normal part of business. As of December 31, 2022, management believes any liability that may ultimately result from the resolution of these matters will not have a material adverse effect on the Company’s consolidated financial position, operating results or cash flows.

11. Stockholders' Equity

Common Stock

On February 3, 2022, the Company entered into Amendment No. 2 to the At the Market Offering Agreement (the "Offering Agreement") with H.C. Wainwright & Co., LLC to further increase the maximum aggregate offering price of shares of Common Stock that may be offered and sold from time to time under the Offering Agreement from $15,280,000 to $19,555,000, which enables the Company to sell an additional $4,275,000 of shares after taking into account prior sales under the Offering Agreement (the "Additional Shares"). In March 2022, the total offering price was updated to $18,573,000 based on the shares that were currently available on Company's existing Form S-3. The terms and conditions of the Offering Agreement otherwise remain unchanged. For the year ended of December 31, 2022, the Company sold a total of 196,843 shares of common stock under the Offering Agreement for aggregate gross proceeds of $3,293,000 at an average selling price of $16.73 per share, resulting in net proceeds of approximately $3,037,000 after deducting commissions and other transaction costs of approximately $256,000.

On October 28, 2022, the Company completed a public offering (the "Offering") of an aggregate of 326,171 units (the "Units") and 64,286 pre-funded units (the "Pre-Funded Units") for a purchase price of $6.30 per unit, resulting in aggregate gross proceeds of approximately $2,055,000 resulting in net proceeds of approximately $1,549,000 after deducting commissions and other transaction costs of approximately $506,000. The Offering closed on October 28, 2022. Each Unit sold in the Offering consisted of one share of the Company's common stock and one common warrant to purchase one share of common stock, and each Pre-Funded Unit consisted of one pre-funded warrant to purchase one share of common stock and one common warrant to purchase one share of common stock. The common warrants will be exercisable at an exercise price of $6.30 per share beginning on the effective date of Company stockholder approval of the issuance of the shares upon exercise of the warrants (the "Warrant Stockholder Approval") and will expire on the fifth anniversary of the effective date of the Warrant Stockholder Approval. The Company evaluated the common warrants issued and determined that they should be classified as equity. As of December 31, 2022, all 64,286 pre-funded warrants sold in the Offering have been exercised and none are currently outstanding.

Warrants

A summary of warrant activity is as follows:

	Number of Shares		Weighted-Average Exercise Price Per Share	Weighted-Average Remaining Contract Term
Balance at January 1, 2021	24,814	$	1,677.28	0.49
Warrants granted	-	$	-	
Warrants exercised	-	$	-	
Warrants expired/canceled	(10,296)	$	3,600.00	
Outstanding and Exercisable at December 31, 2021	14,518	$	313.71	1.44
Balance at January 1, 2022	14,518	$	313.71	1.44
Warrants granted(1)	326,171	$	6.30	
Pre-funded warrants granted	64,286	$	0.045	
Pre-funded warrants exercised	(64,286)	$	0.045	
Warrants expired/canceled	-	$	-	
Outstanding at December 31, 2022	340,689	$	19.40	0.31
Exercisable at December 31, 2022	14,518	$	313.71	0.44

(1) Warrants are subject to stockholder approval and will remain outstanding but unvested until the Company receives such approval. Subsequent to December 31, 2022, the Company's stockholders approved the warrants.

Equity Plans and Agreements

The Amended 2016 Equity Incentive Plan (the "Amended 2016 Plan") was approved by the stockholders in May 2017, under which up to 1,334 shares may be issued pursuant to grants of shares, options, or other forms of incentive compensation. On June 22, 2018, the stockholders approved an amendment to the Amended 2016 Plan to increase the number of shares that may be issued to 2,945 shares. On May 30, 2019, the stockholders approved an amendment to the Amended 2016 Plan to increase the number of shares that may be issued from 2,945 shares to 8,723 shares. On January 13, 2022, the stockholders approved an amendment to the Amended 2016 Plan to increase the number of shares that may be issued from 8,723 to 26,667 shares. On December 15, 2022, the stockholders approved an amendment to the Amended 2016 Plan to increase the number of shares that may be issued under the plan from 26,667 the 66,667. As of December 31, 2022, 60,197 awards were available for issuance under the Amended 2016 Plan.

On December 29, 2017, the Board of Directors of ThermoGenesis Corp. adopted the ThermoGenesis Corp. 2017 Equity Incentive Plan (the "ThermoGenesis Plan") and on the same day granted options to purchase an aggregate of 280,000 shares of ThermoGenesis Corp. common stock to employees, directors, consultants, and advisors of ThermoGenesis Corp. The ThermoGenesis Plan was unanimously approved by the ThermoGenesis stockholders (including the Company) on December 29, 2017. The ThermoGenesis Plan authorizes the issuance of up to 1,000,000 shares of ThermoGenesis common stock. There are 40,000 shares available for issuance as of December 31, 2022. As the ThermoGenesis Plan is for the Company's subsidiary it was not affected by the reverse split effected on December 22, 2022.

Stock Based Compensation

The Company recorded stock-based compensation of $267,000 for the year ended December 31, 2022 and $2,560,000 for the year ended December 31, 2021, as comprised of the following:

	Year Ended December 31,	
	2022	2021
Cost of revenues	$ 18,000	$ 17,000
Selling, general and administrative	229,000	2,275,000
Research and development	20,000	268,000
	$ 267,000	$ 2,560,000

On June 4, 2020, the Chief Executive Officer, Chief Financial Officer and other employees were granted 12,567 options to purchase shares of the Company's common stock at an exercise price of $267.30 per share. In May 2021, five Company executives voluntarily surrendered the options they were awarded. At the time they were surrendered, the exercise price of the options was underwater. No payment or other consideration was paid to the Company executives for surrendering the options. In total 10,889 options were cancelled. As a result of the cancellation, the remaining unamortized expense of $2,008,000 was accelerated and expensed in the year ended December 31, 2021.

Stock Options

The Company issues new shares of common stock upon exercise of stock options. The following is a summary of option activity for the Company's stock option plans:

	Number of Shares	Weighted-Average Exercise Price	Weighted-Average Remaining Contractual Life
Outstanding at January 1, 2022	7,885	$ 546.10	6.8
Granted	-	-	
Expired	(129)	$ 7,361.38	
Forfeited/cancelled	(1,353)	$ 443.23	
Outstanding at December 31, 2022	6,403	$ 430.53	5.93
Vested and Expected to Vest at December 31, 2022	6,246	$ 435.36	5.89
Exercisable at December 31, 2022	6,048	$ 441.00	5.84

The aggregate intrinsic value is calculated as the difference between the exercise price of the underlying awards and the quoted price of the Company's common stock.

Non-vested stock option activity for the year ended December 31, 2022, is as follows:

	Non-vested Stock Options	Weighted-Average Grant Date Fair Value
Outstanding at January 1, 2022	1,643	$ 266.84
Granted	-	
Vested	(983)	$ 280.95
Cancelled/forfeited	(305)	$ 278.55
Outstanding at December 31, 2022	355	$ 217.71

At December 31, 2022, the total compensation cost related to options granted under the Company's stock option plans but not yet recognized was $30,000. This cost will be amortized on a straight-line basis over a weighted-average period of approximately one year and will be adjusted for subsequent forfeitures.

Net Loss Per Share

Net loss per share is computed by dividing the net loss by the weighted average number of common shares outstanding. The calculation of the basic and diluted earnings per share is the same for all periods presented, as the effect of the potential common stock equivalents noted below is anti-dilutive due to the Company's net loss position for all periods presented. Anti-dilutive securities consisted of the following at December 31:

	2022	2021
Common stock equivalents of convertible promissory notes and accrued interest	1,525,751	176,907
Warrants	340,689	14,518
Stock options	6,403	7,885
Total	1,872,843	199,310

12. Revenues

The Company's revenues primarily consist of device sales and service revenue.

Device Sales

Device sales include devices and consumables for BioArchive, AXP, CAR-TXpress and manual disposables. Revenue is recognized when control of the devices passes to the customer, and the Company's performance obligation has been satisfied.

Service Revenue

Service revenue principally consists of maintenance contracts for BioArchive, AXP and CAR-TXpress products. Devices sold have warranty periods of one to two years. After the warranty expires, the Company offers separately priced annual maintenance contracts. Under these contracts, customers pay in advance. These prepayments are recorded as deferred revenue and recognized over time as the contract performance obligations are satisfied.

Revenue is recognized based on the following five-step process as outlined in the Accounting Standards Codification ("ASC") Topic 606, "Revenue from Contracts with Customers": (i) Identify the Contract with the Customer; (ii) Identify Performance Obligations in the Contract; (iii) Determine the Transaction Price; (iv) Allocate the Transaction Price; and (v) Satisfaction of the Performance Obligations (and Recognize Revenue).

Revenues are recorded net of discounts. Shipping and handling fees billed to customers are included in net revenues, while the related costs are included in cost of revenues. Most sales are made with FOB origin shipping terms, with title and control of the goods passing to the customer at the time of shipment. Payments from domestic customers are normally due in two months or less after the title transfers, the service contract is executed, or the services have been rendered. For international customers, payment terms may extend up to 120 days. All sales have fixed pricing and there are currently no variable components included in the Company's revenue.

Generally, all sales are contract sales (with either an underlying contract or purchase order). The Company does not have any material contract assets. When invoicing occurs prior to revenue recognition, a contract liability is recorded (as deferred revenue on the consolidated balance sheet).

Except for limited exceptions, there is no right of return provided for distributors or customers. For distributors, the Company has no control over the movement of goods to the end customer. The Company's distributors control the timing, terms and conditions of the transfer of goods to the end customer. Additionally, for sales of products made to distributors, the Company considers a number of factors in determining when revenue is recognized. These factors include, but are not limited to, whether the payment terms offered to the distributor are considered to be non-standard, the distributor's history of adhering to the terms of its contractual arrangements with the Company, whether the Company has a pattern of granting concessions for the benefit of the distributor, and whether there are other conditions that may indicate that the sale to the distributor is not substantive.

The following table presents net sales by geographic areas:

	Years Ended December 31,	
	2022	2021
United States	$ 6,641,000	$ 5,304,000
China	1,984,000	1,771,000
Portugal	211,000	548,000
Thailand	9,000	401,000
South Korea	325,000	222,000
Vietnam	515,000	332,000
Other	798,000	716,000
Total	$ 10,483,000	$ 9,294,000

The following table summarizes the revenues by product line and type:

	Year Ended December 31, 2022			
	Device Revenue	Service Revenue	Other Revenue	Total Revenue
AXP	$ 5,911,000	$ 480,000	$ -	$ 6,391,000
BioArchive	1,247,000	968,000	-	2,215,000
CAR-TXpress	654,000	190,000	285,000	1,129,000
Manual Disposables	655,000	-	-	655,000
Other	64,000	-	29,000	93,000
Total	$ 8,531,000	$ 1,638,000	$ 314,000	$ 10,483,000

	Year Ended December 31, 2021			
	Device Revenue	Service Revenue	Other Revenue	Total Revenue
AXP	$ 4,940,000	$ 198,000	$ -	$ 5,138,000
BioArchive	827,000	1,518,000	-	2,345,000
CAR-TXpress	875,000	123,000	286,000	1,284,000
Manual Disposables	421,000	-	-	421,000
Other	65,000	-	41,000	106,000
Total	$ 7,128,000	$ 1,839,000	$ 327,000	$ 9,294,000

Contract Balances

Generally, all sales are contract sales (with either an underlying contract or purchase order). The Company does not have any material contract assets. When invoicing occurs prior to revenue recognition, a contract liability is recorded (as deferred revenue on the consolidated balance sheet). Revenues recognized during the year ended December 31, 2022 and 2021 that were included in the beginning balance of deferred revenue were $719,000 and $608,000, respectively. Short-term deferred revenues were $782,000 and $719,000 at December 31, 2022 and 2021, respectively. Long-term deferred revenue was $911,000 and $1,244,000 at December 31, 2022 and 2021, respectively.

Exclusivity Fee

In 2019, the Company entered into a Supply Agreement with Corning Incorporated (the "Supply Agreement"). The Supply Agreement has an initial term of five years with Corning having two options to renew for an additional two-years (up to four years total), unless terminated by either party in accordance with the terms of the Supply Agreement (collectively, the "Term"). Pursuant to the Supply Agreement, the Company has granted Corning exclusive worldwide distribution rights for substantially all X-Series® products under the CAR-TXpress™ platform (the "Products") for the duration of the Term, subject to certain geographical and other exceptions. In addition to any amounts payable throughout the Term for the Products, as consideration for the exclusive worldwide distribution rights Corning paid a $2,000,000 exclusivity fee. The Company recorded $286,000 in revenue for the years ended December 31, 2022 and 2021.

Distribution Agreement

The Company signed a new agreement with its AXP distributor in China through 2023. The new agreement contains annual purchase minimums. In return for the minimum purchase commitment, the Company provided the distributor with AXP processing devices to use during the term of the agreement. The Company maintains ownership of these devices and they must be returned to the Company at the end of the agreement. The Company analyzed the relevant accounting guidance and determined that the equipment and AXP bagsets represented distinct performance obligations. The equipment was concluded to be an embedded lease, accounted for as a sales-type operating lease. For the years December 31, 2022 and 2021, the Company recorded $82,000 and $41,000 in revenue relating to the lease.

Backlog of Remaining Customer Performance Obligations

The following table represents revenue expected to be recognized in the future from the backlog of performance obligations that are unsatisfied (or partially unsatisfied) at the end of the reporting period:

	2023	2024	2025	2026 and beyond	Total
Service revenue	$ 1,157,000	$ 637,000	$ 244,000	$ -	$ 2,038,000
Device revenue (1)	845,000	41,000	-	-	886,000
Exclusivity fee	286,000	286,000	286,000	189,000	1,047,000
Clinical revenue	13,000	13,000	13,000	118,000	157,000
Total	$ 2,301,000	$ 977,000	$ 543,000	$ 307,000	$ 4,128,000

(1) Represents the minimum purchase requirements under the distribution agreement the Company signed with its AXP distributor in China and other revenue deferred at December 31, 2022.

13. Concentrations

The Company had accounts receivable balances or revenues in excess of 10% for the years ended December 31, 2022 and 2021 as shown in the table below:

Accounts Receivable	2022	2021
Customer 1	29%	0%
Customer 2	27%	0%
Customer 3	15%	6%

Revenues	2022	2021
Customer 1	33%	22%
Customer 2	15%	16%

One supplier accounted for 70% and 71% of total inventory purchases during the years ended December 31, 2022 and 2021, respectively.

14. Employee Retention Tax Credit

Employee Retention Tax Credits (“ERTC”), created in the March 2020 CARES Act and then subsequently amended by the Consolidated Appropriation Act (“CAA”) of 2021 and the American Rescue Plan Act (“ARPA”) of 2021, is a refundable payroll credit for qualifying businesses keeping employees on their payroll during the COVID-19 pandemic. Under CAA and ARPA amendments, employers can claim a refundable tax credit against the employer share of social security tax equal to 70% of the qualified wages (including certain health care expenses) paid to employees from January 1, 2021 to September 30, 2021. Qualified wages are limited to $10,000 per employee per quarter in 2021 so the maximum ERTC available is $7,000 per employee per quarter.

The Company was eligible to receive the ERTC credits under the gross receipts decline test when comparing the first, second and third quarters of 2021 to the same quarters in 2019, which qualified the Company to claim ERTC the first three quarters of 2021 under the amended ERTC program. The Company qualified for a refundable payroll tax credit totaling $842,000 for the first three quarters of 2021, which is recorded in other income on the Company's consolidated statement of operations for the year ended December 31, 2021, and prepaid and other current assets on the Company's consolidated balance sheet as of December 31, 2021.

15. Income Taxes

Loss before income tax benefits were comprised of $11,752,000 from U.S. and $60,000 from foreign jurisdictions for the year ended December 31, 2022 and $11,850,000 from U.S. and $30,000 from foreign jurisdictions for the year ended December 31, 2021.

The reconciliation of federal income tax attributable to operations computed at the federal statutory tax rate to income tax benefit is as follows for the:

	Year Ended December 31,	
	2022	2021
Statutory federal income tax benefit	$ (2,481,000)	$ (2,495,000)
Intangible assets	-	-
PPP loan forgiveness		(137,000)
Incentive stock options	-	257,000
Change in valuation allowance	(284,000)	(72,000)
Expiration of net operating losses	1,356,000	1,242,000
Disallowed financing costs	1,179,000	1,282,000
State and local taxes	200,000	(195,000)
Foreign rate differential	11,000	26,000
Other	19,000	92,000
Total income tax expense	$ -	$ -

At December 31, 2022, we had federal net operating loss carryforwards of approximately $123,182,000 to offset future federal taxable income, with $96,250,000 available through 2037 and $26,931,000 available indefinitely. We also had state net operating loss carryforwards of approximately $46,750,000 that may offset future state taxable income through 2042. We also had foreign net operating loss carryforwards of approximately $426,000 that may offset future foreign taxable income through 2030.

At December 31, 2022, the Company has research and experimentation credit carryforwards of $1,459,000 for federal tax purposes that expire in various years between 2023 and 2042, and $1,618,000 for state income tax purposes that do not have an expiration date, and some of which expire in 2031 and 2032.

Significant components of the Company's deferred tax assets and liabilities for federal and state income taxes are as follows:

	Year Ended December 31,	
	2022	2021
Deferred tax assets:		
Net operating loss carryforwards	$ 26,465,000	$ 27,088,000
Income tax credit carryforwards	2,738,000	2,797,000
Stock compensation	421,000	437,000
Lease obligation	908,000	127,000
Deferred revenue	251,000	313,000
Inventory Reserve	517,000	449,000
Sec. 174 Capitalized R&D	317,000	-
Other	159,000	213,000
Total deferred tax assets	31,776,000	31,424,000
Deferred tax liabilities		
Depreciation and amortization	(252,000)	(320,000)
Lease asset	(824,000)	(120,000)
Total deferred tax liabilities	(1,076,000)	(440,000)
Valuation allowance	(30,700,000)	(30,984,000)
Net deferred taxes	$ -	$ -

ASC 740 requires that the tax benefit of net operating losses, temporary differences and credit carryforwards be recorded as an asset to the extent that management assesses that realization is "more likely than not." Realization of the future tax benefits is dependent on the Company's ability to generate sufficient taxable income within the carryforward period. Because of the Company's recent history of operating losses, management believes that recognition of the deferred tax assets arising from the above-mentioned future tax benefits is currently not likely to be realized and, accordingly, has provided a valuation allowance.

The valuation allowance decreased by $284,000 and decreased by $72,000 during the years ended December 31, 2022 and 2021, respectively.

In August 2016, the conversion of the Boyalife debentures effected an "ownership change" as defined under the provisions of the Tax Reform Act of 1986. As a result, any net operating loss and credit carryovers existing at that date will be subject to an annual limitation regarding their utilization against taxable income in future periods. Additionally, before the conversion of the debentures, it is possible that "ownership changes" occurred, which could create additional limitations on the use of our net operating losses and credit carryovers. Additionally, ownership changes may have occurred in the periods after 2016 which could limit our utilization of losses and credits generated in the years 2016 – 2022.

On March 27, 2020, the Coronavirus, Aid, Relief and Economic Stimulus Act ("CARES Act") was enacted. The CARES Act made various tax law changes including among other things (i) increasing the limitation under Section 163(j) of the Internal Revenue Code of 1986, as amended (the "IRC") for 2019 and 2020 to permit additional expensing of interest (ii) enacting a technical correction so that qualified improvement property can be immediately expensed under IRC Section 168(k), (iii) making modifications to the federal net operating loss rules including permitting federal net operating losses incurred in 2018, 2019, and 2020 to be carried back to the five preceding taxable years in order to generate a refund of previously paid income taxes, and (iv) enhancing the recoverability of alternative minimum tax credits. As of December 31, 2020, the Company has taken advantage of the PPP loan provided by the CARES Act. The PPP loan was forgiven in 2021 and forgiveness income has been fully reversed as per federal guidance. The provisions of the CARES Act have had no impact on the Company.

On December 22, 2017, the U.S. enacted comprehensive tax legislation (the "Tax Act"). The Tax Act made broad and complex changes to the U.S. tax code, including the amendment of Code Section 174 requiring capitalization of research and experimentation expenditures for tax years beginning after December 31, 2021. The capitalized expenses are amortized over a period of 5 or 15 years depending on whether they are U.S. or foreign based.

On August 16, 2022, the President signed into law H.R. 5376 (commonly called the "Inflation Reduction Act of 2022"). The primary tax provisions in the new law include an alternative minimum tax ("AMT") on certain large corporations, a tax on stock buybacks and certain energy-related tax credits, each of which become effective after December 31, 2022. The provisions of the Inflation Reduction Act are not expected to have a material effect on the Company's financial statements and related disclosures.

The Company does not have any uncertain tax positions at December 31, 2022 or December 31, 2021. For the most part, tax years after 2002 are all open to examination by federal and state tax authorities and after 2015 by foreign tax authorities.

16. Employee Retirement Plan

401(k) Plan

The Company provides a retirement plan, in accordance with Section 401(k) of the Internal Revenue Code, to all eligible employees. Employees may elect to contribute up to the Internal Revenue Service maximum annual contribution limit. The Company matches employee contributions up to a maximum of 4% per year. The Company recognized an expense of $132,000 and $135,000 for the years ended December 31, 2022 and 2021, respectively, related to matching contributions.

17. Subsequent Events

On January 31, 2023, the Company entered into an Amendment No. 3 to the July 2019 Note with Orbrex (USA) Co. Limited (the "July 2019 Note Amendment"). The July 2019 Note Amendment amends the July 2019 Note, dated July 23, 2019, as amended by Amendment No. 1 dated effective July 23, 2019, and Amendment No. 2 dated July 25, 2022, between the Company and Orbrex (USA) Co. Limited. The July 2019 Note Amendment extends the maturity date of the July 2019 Note from January 31, 2023 to July 31, 2023. The Note Amendment also changed the fixed conversion price to $2.87 per share, provided that in the event that the Company issues shares, options, warrants, or convertible securities, subject to certain exceptions, at an effective price per common share lower than $2.87, then the conversion price will be adjusted to such lower issuance price.

The Company held a Special Meeting of Stockholders on February 23, 2023, at which time the Company's stockholders approved the 326,171 warrants that were issued in the October 2022 Offering. As a result of the approval of the warrants, they are now exercisable as of February 23, 2023 and will be exercisable for a period of five (5) years thereafter, subject to the terms and conditions of the warrants.

In February and March of 2023 through several conversions, the holder of the July 2019 Note converted $603,000 of the Note for 215,000 shares. The current outstanding balance of the Note is $397,000.

On March 6, 2023, the Company entered into an Amendment No. 2 (the "Amendment to Note") to its Second Amended and Restated Convertible Promissory Note with Boyalife Group Inc. (the "Note"), and an Amendment No. 3 (the "Amendment to Credit Agreement") to its First Amended and Restated Revolving Credit Agreement with Boyalife Group Inc. (the "Credit Agreement"). The Amendment to Note amends and extends the maturity date of the Note from March 6, 2023 to December 31, 2023, and provides that interest accrued and unpaid as of March 6, 2023 will be added to the principal balance of the Note, resulting in an outstanding principal balance of $7,278,000 as of March 6, 2023.

On March 15, 2023, the Company entered into a Securities Purchase Agreement (the "Purchase Agreement") with an accredited investor (the "Investor") pursuant to which the Company agreed to issue and sell to the Investor in a private placement (the "Offering") (i) 125,000 shares of its common stock, $0.001 par value (the "Common Shares"), (ii) 946,429 pre-funded warrants to purchase Common Shares at a purchase price of $2.80, and (iii) warrants to purchase up to an aggregate 1,071,429 Common Shares were issued. The warrants have an exercise price of $2.65 per share and are exercisable immediately upon issuance and expire five and one-half years following the issuance for a total net proceeds of approximately $2.6 million, excluding legal and transaction fees. The transaction triggered the down round provision in the July 2019 Note Amendment and the Amendment to the Note lowering the conversion price of both notes to $2.65. The Offering closed on March 20, 2023.

As part of the Offering, the Company entered into a Registration Rights Agreement, dated March 15, 2023, with the Investor, pursuant to which the Company agreed to register the resale of the shares of Common Stock sold in the Offering and the shares of Common Stock issuable upon exercise of the Common Warrants and the Pre-Funded Warrants.

In connection with the Offering, the Company entered into a Warrant Amendment Agreement (the "Warrant Amendment Agreement"), dated March 15, 2023, with the Investor, whereby the Company agreed to amend existing warrants, held by the Investor, to purchase up to an aggregate of 158,731 shares of Common Stock that were previously issued in October 2022. These warrants had an exercise price of $6.30 per share and, pursuant to the Warrant Amendment Agreement, have been amended to reduce the exercise price to $2.65 per share effective upon the closing of the Offering. On March 21, 2023, the 158,731 warrants were exercised in full.

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

None.

ITEM 9A. Controls and Procedures

Disclosure Controls and Procedures
We carried out an evaluation, under the supervision and with the participation of management, including our Chief Executive Officer and our Chief Financial Officer, of the effectiveness of the design and operation of our disclosure controls and procedures (as defined by Exchange Act Rule 13a-15(e) and 15d-15(e)) as of the end of our last fiscal quarter pursuant to Exchange Act Rule 13a-15. The term "disclosure controls and procedures" means controls and other procedures designed to ensure that information required to be disclosed in reports filed or submitted under the Exchange Act is recorded, processed, summarized and reported, within the time periods specified in the SEC's rules and forms. Disclosure controls and procedures include, without limitation, controls and procedures designed to ensure that such information is accumulated and communicated to management, including the Chief Executive Officer and the Chief Financial Officer, as appropriate, to allow timely decisions regarding required disclosure. Based upon that evaluation, our Chief Executive Officer and Chief Financial Officer concluded that our disclosure controls and procedures were effective as of December 31, 2022.

Management's Report on Internal Control over Financial Reporting
Management is responsible for establishing and maintaining adequate internal control over financial reporting as defined in Rules 13a-15(f) and 15d-15(f) under the Exchange Act. Under the supervision and with the participation of our management, including our Chief Executive Officer and Chief Financial Officer, we conducted an evaluation of the effectiveness of its internal control over financial reporting as of December 31, 2022 based on criteria established in the framework in *Internal Control – Integrated Framework* issued by the Committee of Sponsoring Organizations of the Treadway Commission in 2013. Based on this evaluation, our management concluded that our internal control over financial reporting was effective as of December 31, 2022.

Because of its inherent limitations, internal control over financial reporting may not prevent or detect misstatements. Projections of any evaluation of effectiveness to future periods are subject to the risk that controls may become inadequate because of changes in conditions, or that the degree of compliance with the policies or procedures may deteriorate. All internal control systems, no matter how well designed, have inherent limitations. Therefore, even those systems determined to be effective can provide only reasonable assurance with respect to financial statement preparation and presentation.

Attestation Report of Independent Registered Public Accounting Firm
We are a "non-accelerated filer" as defined by Rule 12b-2 of the Exchange Act, and as such, we are not required to provide an attestation report on the Company's internal control over financial reporting.

Changes in Internal Control over Financial Reporting
There have been no changes in our internal controls over financial reporting that occurred during the quarter ended December 31, 2022, that have materially affected, or are reasonably likely to materially affect our internal controls over financial reporting. We believe that a control system, no matter how well designed and operated, cannot provide absolute assurance that the objectives of the control system are met, and no evaluation of controls can provide absolute assurance that all control issues and instances of fraud, if any, within any company have been detected.

ITEM 9B. Other Information

None.

ITEM 9C. Disclosure Regarding Foreign Jurisdictions that Prevent Inspections

Not applicable.

PART III

ITEM 10. Directors, Executive Officers and Corporate Governance

Directors

Set forth below is the name, age, and certain biographical information for each of our current directors.

	Age*
Xiaochun (Chris) Xu, Ph.D.	51
Vivian Liu	61
Russell Medford, Ph.D.	68
Jeff Thomis, Ph.D.	77
Haihong Zhu	57

* Age as of March 15, 2023.

Biographies

Xiaochun (Chris) Xu, PhD, MBA — **Director since March 2016**

Dr. Xu joined our Board in March 2016. On November 13, 2017, the Board elected Dr. Xu as President and Chief Executive Officer ("CEO") (transitioning from interim Chief Executive Officer as of November 2016; he currently serves as Chairman of the Board). Dr. Xu is also a member of the Board of Directors of our wholly-owned subsidiary, ThermoGenesis Corp. Dr. Xu has been the Founder, Chairman and CEO of Boyalife Group Ltd., China since July 2009. From 2008 to 2009, he was Vice President at Founder Group, a major Chinese technology conglomerate with interests in information technology, pharmaceuticals, real estate, finance, and commodities trading. From 2000 to 2008, Dr. Xu served in various management positions at Pfizer Inc. and two Nasdaq publicly traded bio-pharmaceutical companies. Dr. Xu received his B.SC. in Biochemistry from the University of Saskatchewan, his Ph.D. degree in Immunology from Washington University School of Medicine (St. Louis, Missouri, USA) and an Executive MBA degree from Emory University (Atlanta, Georgia, USA). We believe that Dr. Xu is well qualified to serve as a director, due to his extensive and varied experience and knowledge as an executive and investor in the biotechnology, medical device, and pharmaceuticals industry, and we believe that Dr. Xu will continue to be a valuable asset to the Company and its Board.

Vivian Liu — **Director since June 2022**

Ms. Liu was appointed to the Board of Directors in June 2022. Since October 2018, Ms. Liu has served as Head of Corporate Affairs for PREMIA Holdings (HK) Limited, a developer and manager of clinical-genomic oncology databases in Asia and service provider to pharmaceutical companies seeking to operate clinical trials throughout Asia. Ms. Liu currently serves as member of the Board of Directors of Aytu BioPharma, Inc. ("AYTU"). Ms. Liu served as a member of the Board of Directors and as President and Chief Executive Officer and previously as Chief Financial Officer for Innovus Pharmaceuticals, Inc., (OTCQB: INNV) from December 2011 to February 2020 and from December 2011 to January 22, 2013, respectively. From January 2011 to December 2011, she served as the President and Chief Executive Officer of FasTrack Pharmaceutical, which was later acquired by Innovus Pharmaceuticals. Ms. Liu was the Chief Operating Officer and a member of the Board of Directors of ThermoGenesis Holdings, Inc. from February 2017 to October 2018 and November 2016 to October 2018, respectively. From February 2013 to March 2017, Ms. Liu served as Managing Director of OxOnc Services Company, an oncology development company. In 1995, Ms. Liu co-founded NexMed, Inc. ("NexMed"), which in 2010 was renamed Apricus BioSciences, Inc. (Nasdaq: APRI). Ms. Liu was NexMed's President and Chief Executive Officer from 2007 to 2009. Prior to her appointment as President of NexMed, Ms. Liu served in several executive capacities at NexMed, including Executive Vice President, Chief Operating Officer, Chief Financial Officer and Vice President of Corporate Affairs. She was appointed as a director of NexMed in 2007 and served as Chairman of its Board of Directors from 2009 to 2010. Ms. Liu has an M.P.A. from the University of Southern California and has a B.A. from the University of California, Berkeley. Ms. Liu is one of our independent directors pursuant to applicable Nasdaq rules and is qualified as an Audit Committee Financial Expert as defined in Regulation S-K Item 407(d)(5)(ii). We believe that Ms. Liu is qualified to serve as one of our directors because of her experience as a director of public companies, as well as her executive leadership experience and experience in the pharmaceutical industry, and we believe that Ms. Liu will be a valuable asset to the Company and our Board.

Russell Medford, MD, PhD **Director since February 2017**

Dr. Medford joined our Board in February 2017. Dr. Medford is Chairman and Chief Executive Officer of Covanos, Inc., a medical device company, since 2017 and a Managing Partner of the Salutramed Group, LLC, a life sciences management consultancy, since 2012. Dr. Medford has also served as the CEO of healthEgames, Inc., a digital healthcare company, and as the Chairman of ViaMune, Inc., an immuno-oncology therapeutics company, in each case since 2014. From 1993 to 2009, Dr. Medford served as co-founder, President, CEO and Director of AtheroGenics, Inc. ("AGIX"). Dr. Medford was a founding member of the Board of Directors of Inhibitex, Inc. ("INHX") until it was acquired by Bristol-Myers-Squibb in 2012. Dr. Medford is a board-certified physician and currently holds numerous trustee or board positions including with the Georgia Global Health Alliance, Inc. and Georgia BIO. Dr. Medford has served on the faculties of both the Harvard Medical School and Emory University School of Medicine and obtained his M.D. and Ph.D. from the Albert Einstein College of Medicine. We believe that Dr. Medford is well qualified to serve as a director due to his experience as a founder and executive of several pharmaceutical development companies, and we believe that Dr. Medford will continue to be a valuable asset to the Company and its Board in connection with the Company's clinical development activities. Dr. Medford is one of our independent directors pursuant to applicable Nasdaq rules and is qualified as an Audit Committee Financial Expert as defined in Regulation S-K Item 407(d)(5)(ii).

Joseph (Jeff) Thomis, PhD **Director since January 2017**

Dr. Thomis joined our Board in January 2017. Since 2012, Dr. Thomis has been the CEO at Thomis Consulting BVBA. From 1976 until 1997 he held a number of R&D positions at Bristol-Myers Squibb. In the period 1997-2012 he was employed at Quintiles Transnational where he held numerous positions including Chairman of the American Management Board, President of Global Clinical Development Services and President of European Clinical Development Services. He has been a partner in OxOnc Development LP, an oncology product development company. Additionally, Dr Thomis has held several Board positions. He was non-executive director of PDP Courier services; Chairman of the Board of Idis Pharma and of WEP Clinical, two global companies providing unlicensed medicines to patients with unmet medical needs. Chairman of the Board and member of the Audit Committee of Quotient Sciences, a translational pharmaceutics company and a non-executive director at NovaQuest LLC, a private equity company. He is currently the Chairman of the Board of Glasgow Memory Clinic Holdings, a site management company. Dr. Thomis received his Ph.D. in Pharmaceutical Sciences from the University of Leuven in Belgium. We believe that Dr. Thomis is well qualified to serve as a director due to his extensive experience with clinical trials and contract research organizations, and we believe that Dr. Thomis will continue to be a valuable asset to the Company and its Board by providing valuable insight and knowledge with respect to the Company's clinical development activities. Dr. Thomis is one of our independent directors pursuant to applicable Nasdaq rules.

Haihong Zhu **Director since January 2022**

Ms. Zhu joined ThermoGenesis in 2004 and was appointed Chief Operating Officer in 2018 and joined our Board in January 2022. During her time with the Company, she has served in various roles with increasing managerial responsibilities in research and development, customer service, global sales and operations. Additionally, Ms. Zhu has helped the Company's clients and partners build over a dozen premier stem cell banks in different regions around the world. Ms. Zhu brings over 20 years of technical and marketing experience in stem cell field and has contributed significantly to the establishment of ThermoGenesis' commercial global presence. Prior to joining ThermoGenesis, Ms. Zhu worked as a technical professional at BioTransplant Inc., a biopharmaceutical company that develops proprietary pharmaceuticals and organ transplantation systems, and conducted biomedical research in the stem cell laboratory at Harvard Medical School, focusing on HIV vaccine research. Ms. Zhu received a bachelor's degree in biology from Shanghai University of Science & Technology and completed an advanced biostatistics program at Boston University. We believe Ms. Zhu is well qualified to serve as a director due to her extensive experience in the stem cell banking and cell and gene therapy fields. As a director, Ms. Zhu will continue to be a valuable asset to the Company and its Board by providing insight and knowledge with respect to the Company's commercial operation activities.

To our management's knowledge, there are neither any family relationships between any of our directors or executive officers nor have any of our directors been involved in a legal proceeding that would be required to be disclosed pursuant to Item 401(f) of Regulation S-K of the Exchange Act other than as may be disclosed above.

Executive Officers

Set forth below is the name, age, and certain biographical information for each of our current executive officers:

Name	Position	Age
Chris Xu, Ph.D., MBA	Chief Executive Officer & Chairman	51
Haihong Zhu	Chief Operating Officer	57
Jeff Cauble, CPA	Chief Financial Officer	50

Biographies

The biographies for Dr. Xu and Ms. Zhu can be found above under Item 10. Directors, Executive Officers and Corporate Governance – Directors.

Jeffery Cauble joined the Company in 2010 and was appointed Chief Financial Officer in December 2019. During his time with the Company, Mr. Cauble has served in various accounting roles with the Company, including Vice President of Finance, Controller and Director of Financial Planning & Analysis. He brings over 25 years of accounting experience in various financial and managerial roles in the biotechnology, medical device and agricultural industries. Mr. Cauble is a Certified Public Accountant and graduate of the University of Idaho, where he obtained a bachelor's degree with a dual major in accounting and finance.

Executive officers serve at the pleasure of our Board of Directors. To our management's knowledge, there are neither any family relationships between any of our executive officers, directors, or key employees nor have any of our executive officers or key employees been involved in a legal proceeding that would be required to be disclosed pursuant to Item 401(f) of Regulation S-K of the Exchange Act.

CORPORATE GOVERNANCE

General

Our Board believes that good corporate governance is important to ensure that ThermoGenesis is managed for the long-term benefit of our stockholders. This section describes key corporate governance guidelines and practices that we have adopted. Complete copies of our corporate governance guidelines, committee charters and code of ethical conduct described below are available under the "*Investors*" section of our website at www.thermogenesis.com.

Board Operating and Governance Guidelines

Our Board has adopted a number of operating and governance guidelines, including the following:

- Formalization of the ability of each committee to retain independent advisors;
- Directors have open access to the Company's management; and
- Independent directors may meet in executive session prior to or after each regularly scheduled Board meeting without management present.

Our Board has concluded that Dr. Russell Medford, Dr. Joseph Thomis and Ms. Vivian Liu are "independent" as defined by Nasdaq and under Rule 10A-3(b)(1) under the Securities Exchange Act of 1934, as amended (the "Exchange Act"), as that term relates to membership on our Board, and the Board is comprised of a majority of independent directors.

Board Leadership Structure

Dr. Chris Xu serves as both our Chairman of the Board and CEO. The Board and its independent directors believe the most effective Board leadership structure at the present time is for the CEO to serve as Chairman of the Board because the CEO is ultimately responsible for executing our strategy and because our performance is an integral part of the deliberations undertaken by the Board. The Company does not currently designate a "lead independent director" but reserves the authority to do so at any time. The Board reserves the authority to modify this structure to best address and advance the interests of all stockholders, as and when appropriate.

Risk Oversight

The Board has an active role, as a whole and also at the committee level, in overseeing risk management. The Board regularly reviews information regarding the Company's liquidity and operations, as well as the risks associated with each. The Company's Compensation Committee is responsible for overseeing the management of risks relating to the Company's executive compensation plans and arrangements. The Audit Committee oversees management of risks relating to financial reporting, internal controls and compliance with legal and regulatory requirements. The Governance and Nominating Committee oversees the management of risks associated with corporate governance, the independence of the Board and potential conflicts of interest. The Board is also responsible for evaluating and managing cybersecurity risks. While each committee is responsible for evaluating certain risks and overseeing the management of such risks, the entire Board is regularly informed through committee reports about such risks.

Governance and Nominating Committee

The Governance and Nominating Committee was formed to address general governance and policy oversight and succession planning, to identify qualified individuals to become prospective directors and make recommendations regarding nominations for the Board, to advise the Board with respect to appropriate composition of Board committees, to advise the Board about and develop and recommend to the Board appropriate corporate governance documents, to assist the Board in implementing guidelines, to oversee the annual evaluation of the Board and the Company's CEO and to perform such other functions as the Board may assign to the committee from time to time. The Governance and Nominating Committee has a Charter which is available on the Company's website at www.thermogenesis.com. The Governance and Nominating Committee currently consists of two directors: Dr. Russell Medford (Governance and Nominating Committee Chairman) and Dr. Thomis, each of whom has been determined to be independent under applicable Nasdaq rules by the Board.

Audit Committee

The Audit Committee of the Board makes recommendations regarding the appointment, compensation, retention and oversight of the independent registered public accounting firm, reviews the scope of the annual audit undertaken by our independent registered public accounting firm and the progress and results of their work, reviews our financial statements, and oversees the internal controls over financial reporting and corporate programs to ensure compliance with applicable laws. The Audit Committee reviews the services performed by the independent registered public accounting firm and determines whether they are compatible with maintaining the registered public accounting firm's independence. The Audit Committee has a Charter, which is reviewed annually and as may be updated as required due to changes in industry accounting practices or the promulgation of new rules or guidance documents. The Audit Committee Charter is available on the Company's website at www.thermogenesis.com. The Audit Committee currently consists of the following three directors: Ms. Liu (Audit Committee Chairman), Dr. Medford and Dr. Thomis, each of whom has been determined to be independent under applicable Nasdaq and SEC rules by the Board. The Board has further determined that Ms. Liu and Dr. Medford are qualified as Audit Committee Financial Experts as defined in Regulation S-K Item 407(d)(5)(ii) and applicable Nasdaq rules.

Compensation Committee

The Compensation Committee of the Board reviews and approves executive compensation policies and practices, reviews salaries and bonuses for our CEO, administers the Company's stock option plans and other benefit plans, and considers other matters as may, from time to time, be referred to them by the Board. The Board, along with the Compensation Committee, believes that the compensation of employees should be fair to both employees and stockholders, externally competitive, and designed to align the interests of employees with those of the stockholders. The Compensation Committee has the authority to form, and to delegate its authority to, one or more subcommittees, as it deems appropriate. The Compensation Committee may consult with the CEO and other executive officers of the Company in determining applicable policies, but the CEO may not be present during any voting or deliberations on his or her compensation. The Compensation has the authority to retain and terminate any independent compensation consultants or other advisors, in accordance with applicable Nasdaq rules, to assist it in any aspect of the evaluation of a director, CEO or senior compensation or on any other subject relevant to the Committee's responsibilities, including the authority to approve such consultant's or advisor's fees and other retention terms. The Compensation Committee elected not to engage an independent compensation consultant in undertaking its duties for fiscal year 2022. The Compensation Committee has a charter which is available on the Company's website at www.thermogenesis.com. The Compensation Committee consists of three directors: Dr. Thomis (Compensation Committee Chairman), Dr. Medford and Ms. Liu each of whom has been determined to be independent under applicable Nasdaq rules by the Board.

Compensation Committee Interlocks and Insider Participation

No member of the Compensation Committee has served as one of our officers or employees at any time. None of our executive officers serves as a member of the compensation committee of any other company that has an executive officer serving as a member of our board of directors. None of our executive officers serves as a member of the board of directors of any other company that has an executive officer serving as a member of the Compensation Committee.

Board and Committee Meetings and Attendance

During the calendar year ended December 31, 2022, the Board met six (6) times, the Audit Committee met four (4) times, the Compensation Committee met four (4) times, and the Governance and Nominating Committee met five (5) times. During the calendar year ended December 31, 2022, each director attended at least 75% of the aggregate of the total number of meetings of the Board held while serving as a director and the aggregate of the total number of meetings of each Board committee of which that director is a member held while serving as a member of such committee. Generally, our directors attend our annual meetings. All of the directors elected to our Board at our most recent annual stockholders' meeting, held December 15, 2022, attended the meeting in person.

Director Nominating Procedures

Subject to the Restated Nomination Agreement (as described below), the Governance and Nominating Committee assists our Board in identifying director nominees consistent with criteria established by our Board. Although the Governance and Nominating Committee does not currently have a specific policy with regard to consideration of director candidates recommended by stockholders, the Board and the Governance and Nominating Committee believe that the Governance and Nominating Committee would provide such recommendations the same consideration as other candidates. Any recommendation submitted by a stockholder to the Governance and Nominating Committee should include information relating to each of the qualifications outlined below concerning the potential candidate along with the other information required by the rules of the SEC and our Bylaws for stockholder nominations.

Generally, nominees for director are identified and suggested to the Governance and Nominating Committee by the Company's current directors or management using their business networks and evaluation criteria they deem important, which may or may not include diversity. While the Company does not have a specific policy regarding diversity and has not established minimum experience or diversity qualifications for director candidates, when considering the nomination of directors, the Governance and Nominating Committee does generally consider the diversity of its directors and nominees in terms of knowledge, experience, background, skills, expertise and other demographic factors. The Company does not impose formal term limits on its directors.

Delinquent Section 16(a) Reports

Section 16(a) of the Securities Exchange Act requires our executive officers and directors, and persons who own more than 10% of our Common Stock, to file reports regarding ownership of, and transactions in, our securities with the SEC and to provide us with copies of those filings. Based solely on our review of the copies of such forms received by us we believe that during the twelve months ended December 31, 2022, all filing requirements applicable to our officers, directors and greater than 10% beneficial owners were filed timely, except for the Form 3 filed by Haihong Zhu on January 27, 2022.

Code of Ethics

We have adopted a code of ethics that applies to all employees, including our CEO and CFO, Controller or any person performing similar functions. A copy of our code of ethical conduct can be found on our website at www.thermogenesis.com. We will satisfy the disclosure requirements under Item 5.05 of Form 8-K regarding any material amendment to our code of ethics, and any waiver from a provision of our code of ethics that applies to all employees, including our CEO and CFO, Controller or any person performing similar functions, by posting such information on our website at the internet website address set forth above. The code of ethics will be provided without charge upon request submitted to hr@thermogenesis.com. The Company will report any amendment or waiver to the code of ethics on our website within four (4) business days.

ITEM 11. Executive Compensation

Named Executive Officers Summary Compensation Table

The following table sets forth certain information regarding the compensation paid to our named executive officers ("NEOs") for the fiscal years ended December 31, 2022 and 2021:

Name and Principal Position	Year	Salary ($)	Bonus ($)	Stock Awards ($)	Option Awards ($)	All Other ($)	Total ($)
Chris Xu, Ph.D., MBA	2022	519,000	180,000	-	-	-	699,000
Chief Executive Officer	2021	500,000	248,000	-	-	-	748,000
Haihong Zhu (1)	2022	458,000	96,000	-	-	-	554,000
Chief Operating Officer							
Jeffery Cauble, CPA	2022	264,000	61,000	-	-	-	325,000
Chief Financial Officer	2021	254,000	95,000	-	-	-	349,000

(1) Ms. Zhu became an executive officer in January 2022.

Employment Agreements

Dr. Xiaochun (Chris) Xu. Dr. Xu has an employment agreement with the Company (the "Employment Agreement") that provides that Dr. Xu is entitled to a base salary of $520,000 per annum and that Dr. Xu will devote at least of a majority of his full working time and efforts to the affairs of the Company. Dr. Xu is eligible to receive a performance bonus equal to a percentage of his base salary based on performance against annual objectives at the discretion of the Board (an "STI Award"). The target percentage is 60%, but the actual percentage as determined by the Board may range from 0% to higher than 100% of his base salary. Either of Dr. Xu or the Company may terminate the employment agreement at any time and for any reason. In the event that Dr. Xu's employment is terminated by the Company without "Cause" or he resigns for "Good Reason" (each as defined in the Employment Agreement), he will be entitled to receive a sum equal to eighteen months of base salary in effect as of the termination date, a lump sum cash payment equal to one and a half times the most recently established and earned annual STI Award, all options granted to Dr. Xu to acquire Company Common Stock shall become vested as of the termination date, and the Company shall pay up to eighteen months of COBRA premiums. If Dr. Xu's employment is terminated by the Company without Cause or he resigns for Good Reason, in each case, within three months prior to or eighteen months following certain changes in control of the Company, he will be entitled to receive a lump sum cash payment equal to thirty-six months of the base salary in effect as of the termination date, a lump sum cash payment equal to three times the most recently established and earned annual STI Award, all options granted to Dr. Xu to acquire Company Common Stock shall become vested as of the termination date, and the Company shall pay up to twenty four months of COBRA premiums.

Jeffery Cauble. The Company does not have an employment agreement with Mr. Cauble. Mr. Cauble's current base salary is $264,000 per year.

Haihong Zhu. The Company does not have an employment agreement with Ms. Zhu. Ms. Zhu's current base salary is $460,000 per year.

Both Mr. Cauble and Ms. Zhu are eligible to receive a paid bonus under the Company's short-term incentive program.

Outstanding Equity Awards at Fiscal Year-End

The following table provides information about outstanding options held by the NEOs as of December 31, 2022.

	Option Awards			
	No. of Securities Underlying Unexercised Options (#) Exercisable	Equity Incentive Plan Awards: Securities Underlying Unexercised Unearned Options (#)	Option Exercise Price ($)	Option Expiration Date
Chris Xu, Ph.D.	3	-	1,890.00	09-Mar-2023
	667	-	1,350.00	29-Dec-2027
	112	-	1,309.50	14-Dec-2023
	3	-	1,287.00	01-Jul-2023
	356	-	134.06	14-Dec-2028
	1,423	-	134.06	14-Dec-2028
	30,000(1)	-	1.50	29-Dec-2027
Haihong Zhu	5	-	1,876.50	01-Sept-2023
	112	-	1,350.00	29-Dec-2027
	178	-	134.06	14-Dec-2028
	712	-	134.06	14-Dec-2028
	50,000(1)	-	1.50	29-Dec-2027
	-	250,000(1)	0.65	07-Apr-2029
	-	250,000(1)	0.65	07-Apr-2029
	250,000(1)	-	0.65	07-Apr-2029
Jeffery Cauble, CPA	9	-	1,287.00	07-Jul-2023
	89	-	134.06	14-Dec-2028
	356	-	134.06	14-Dec-2028

(1) Represents ThermoGenesis Corp. options.

Potential Payments upon Termination or Change in Control

Dr. Xu has certain change of control rights under the Employment Agreement, as described above. The Compensation Committee considers these rights, on a case-by-case basis, to provide NEOs with the ability to make appropriate, informed decisions on strategy and direction of the Company that may adversely impact their particular positions, but nevertheless are appropriate for the Company and its stockholders. Our Compensation Committee believes that the Company should provide reasonable severance benefits to certain of its executive officers, recognizing that it may be difficult for such officers to find comparable employment within a short period of time and that severance arrangements may be necessary to attract highly qualified officers in a competitive hiring environment.

The following table describes the potential payments upon a hypothetical termination without cause, resignation for good reason or due to a change in control of the Company on December 31, 2022, for Dr. Xu. The actual amounts that may be paid upon an executive's termination of employment can only be determined at the actual time of such termination.

Name	Salary ($)(1)	Incentive Compensation ($)(1)	Health Benefits ($)	Total ($)
Chris Xu, Ph.D.				
Termination without cause or resignation for good reason	780,000	129,000	102,000	1,011,000
Termination following a change of control	1,560,000	936,000	136,000	2,632,000

(1) Payable in a lump-sum payment.

Ms. Zhu and Mr. Cauble do not have change of control rights under an employment agreement.

COMPENSATION OF DIRECTORS

Director Compensation Table

The following table sets forth the compensation received by each of the Company's non-employee directors for the year ended December 31, 2022.

Name	Fees Earned or Paid in Cash ($)	Option Awards ($)	Total ($)
Russell Medford, Ph.D.	$ 54,500	-	$ 54,500
Jeff Thomis, Ph.D.	$ 56,000	-	$ 56,000
Vivian Liu(1)	$ 28,000	-	$ 28,000
Debra Donaghy, CPA(2)	$ 26,250	-	$ 26,250

(1) Ms. Liu joined the Board in June 2022.
(2) Ms. Donaghy resigned as a member of our Board of Directors effective June 12, 2022.

The following table sets forth the aggregate number of option awards held by each non-employee director as of December 31, 2022:

Name	Aggregate Number of Option Awards
Russell Medford, Ph.D.	375
Jeff Thomis, Ph.D.	375
Vivian Liu(1)	-
Debra Donaghy, CPA(2)	251

(1) Ms. Liu joined the Board in June 2022.
(2) Ms. Donaghy resigned as a member of our Board of Directors effective June 12, 2022.

Each non-employee director receives an annual fee of $35,000. The chairperson of each standing committee receives an additional annual fee of $15,000 for the Audit Committee, $10,000 for the Compensation Committee and $7,000 for the Governance Committee. Each non-chair committee member receives an annual fee of $7,500 for the Audit Committee, $5,000 for the Compensation Committee, and $3,500 for the Governance Committee.

All fees are paid quarterly. In addition, we reimburse our directors for their reasonable expenses incurred in attending meetings of the Board and its committees.

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

Equity Compensation Plans

The following table provides information for all of the Company's equity compensation plans in effect as of December 31, 2022.

Plan Category	Number of securities to be issued upon exercise of outstanding options (a)	Weighted-average exercise price of outstanding options (b)	Number of securities remaining available for future issuance under equity compensation plans (excluding securities reflected in column (a)) (c)
Equity compensation plans approved by security holders	6,403	$ 430.53	60,197
Equity compensation plans not approved by security holders	-	-	-
Total	6,403		60,197

On October 6, 2022, the Board of Directors of the Company approved and adopted an amendment (the "Plan Amendment") to the Company's 2016 Equity Incentive Plan (the "2016 Plan") to increase the aggregate number of shares that may be issued under the 2016 Plan from 26,667 to 66,667 shares. The Plan Amendment was approved by the Company's stockholders at its annual stockholder meeting held on December 15, 2022.

On December 29, 2017, the Board of Directors of ThermoGenesis Corp., a wholly-owned subsidiary of the Company ("ThermoGenesis Sub"), adopted the ThermoGenesis Corp. 2017 Equity Incentive Plan (the "ThermoGenesis Sub Plan"). The ThermoGenesis Sub Plan was unanimously approved by the ThermoGenesis Corp. stockholders (including the Company) on December 29, 2017. The ThermoGenesis Sub Plan authorizes the issuance of up to 1,000,000 shares of ThermoGenesis Corp. common stock, all of which may be issued as incentive stock options under Section 422 of the Code. The ThermoGenesis Sub Plan is administered by the Compensation Committee of the ThermoGenesis Corp. Board of Directors, except that if such a committee is not appointed, the plan will be administered by the ThermoGenesis Holdings, Inc. Board of Directors. As of March 15, 2023, Dr. Xu holds 30,000 stock options of ThermoGenesis Corp. out of the ThermoGenesis Sub Plan, of which 30,000 are exercisable. Ms. Zhu holds 300,000 stock options of ThermoGenesis Corp Sub Plan, of which 300,000 are exercisable. As the ThermoGenesis Sub Plan is for the Company's subsidiary it was not affected by the reverse split effected on December 22, 2022.

STOCK OWNERSHIP OF CERTAIN BENEFICIAL OWNERS AND MANAGEMENT OF THERMOGENESIS HOLDINGS, INC.

The Company has only one class of stock outstanding, our Common Stock. The following table sets forth certain information as of March 15, 2023, with respect to the beneficial ownership of the Company's Common Stock for (i) each director and director nominee, (ii) each named executive officer herein, (iii) all of Company's directors and executive officers as a group, and (iv) each person known to us to own beneficially five percent (5%) or more of the outstanding shares of Company's Common Stock. As of March 15, 2023, there were 1,137,138 shares of Common Stock outstanding. Each share of the Company's Common Stock is entitled to one vote.

To the Company's knowledge, except as indicated in the footnotes to this table or pursuant to applicable community property laws, the persons named in the table have sole voting and investment power with respect to the shares of Common Stock indicated.

Name of Director, Director Nominee or Named Executive Officer	Amount and Nature of Beneficial Ownership(1)	Percent of Class
Xiaochun (Chris) Xu, Ph.D., MBA	2,824,767(2)	77%
Russell Medford, Ph.D.	375(3)	*
Jeff Thomis, Ph.D.	375(3)	*
Vivian Liu (4)	-	*
Haihong Zhu	1,007(3)	*
Jeffery Cauble, CPA	474(5)	*
Officers & Directors as a Group (6 persons)	2,826,998	77%
Name and Address of 5% Beneficial Owners		
Boyalife Group Inc.	2,822,206(6)	77%

* Less than 1%.

(1) "Beneficial Ownership" is defined pursuant to Rule 13d-3 of the Exchange Act, and generally means any person who directly or indirectly has or shares voting or investment power with respect to a security. A person shall be deemed to be the beneficial owner of a security if that person has the right to acquire beneficial ownership of the security within 60 days, including, but not limited to, any right to acquire the security through the exercise of any option or warrant or through the conversion of a security. Any securities not outstanding that are subject to options or warrants shall be deemed to be outstanding for the purpose of computing the percentage of outstanding securities of the class owned by that person, but shall not be deemed to be outstanding for the purpose of computing the percentage of the class owned by any other person. Some of the information with respect to beneficial ownership has been furnished to us by each director or officer, as the case may be.

(2) Dr. Xu's beneficial ownership represents (i) 2,561 shares issuable upon the exercise of options; (ii) 2,549,291 shares issuable as of March 15, 2023 upon the conversion of the Second Amended and Restated Convertible Promissory Note payable by the Company to Boyalife Group Inc.; and (iii) 272,915 shares owned by Boyalife Group, Inc. Dr. Xu has sole voting and dispositive power over the shares held by Boyalife Group Inc.

(3) Represents shares issuable upon the exercise of options that are vested as of March 15, 2023 or within 60 days thereafter.

(4) Ms. Liu joined the Board in June 2022.

(5) Includes 20 common shares and 454 shares issuable upon the exercise of options that are vested as of March 15, 2023 or within 60 days thereafter.

(6) Consists of 272,915 common shares owned by Boyalife Group Inc. and 2,549,291 common shares issuable upon the conversion of the Second Amended and Restated Convertible Promissory Note payable by the Company to Boyalife Group Inc. Dr. Xu has sole voting and dispositive power over Boyalife Group Inc. The principal business address of Boyalife Group Inc. is 2453 S. Archer Ave., Suite B, Chicago, IL 60616.

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

Certain Relationships and Related Party Transactions

For the fiscal year ended December 31, 2022 and 2021, there were the following related party transactions reportable under Item 404 of Regulation S-K.

Convertible Promissory Note and Revolving Credit Agreement

In March 2017, the Company entered into a Credit Agreement with Boyalife Asset Holding II, Inc., which assigned the Credit Agreement to Boyalife Group (the "Lender") in July 2022. The Lender is owned and controlled by the Company's Chief Executive Officer and Chairman of our Board of Directors. The Credit Agreement, as amended, grants to the Company the right to borrow up to $10,000,000 (the "Loan") at any time prior to December 31, 2023 (the "Maturity Date"). As of December 31, 2022, the Company had an outstanding principal balance on the Loan of $7,000,000.

The Credit Agreement and the Convertible Promissory Note issued thereunder (as amended, the "Note") provide that the principal and all accrued and unpaid interest under the Loan will be due and payable on the Maturity Date, with payments of interest-only due on the last day of each calendar year (but with accrued interest as of March 6, 2023 being capitalized to principal). The Loan bears interest at 22% per annum, simple interest. The Company has five business days after the Lender demands payment to pay the interest due before the Loan is considered in default. The Loan can be prepaid in whole or in part by the Company at any time without penalty. The Company paid $2,628,000 and $2,082,000 for interest related to the Note in the years ended December 31, 2022 and 2021, respectively. Additionally, a payment of $1,492,000 was paid in January 2023 relating to interest accrued on the Note during year ended December 31, 2022.

The Maturity Date of the Note is subject to acceleration at the option of the Lender upon customary events of default, which include a breach of the Loan documents, termination of operations, or bankruptcy. The Lender's obligation to make advances under the Loan is subject to the Company's representations and warranties in the Credit Agreement continuing to be true at all times and there being no continuing event of default under the Note.

The Credit Agreement includes a down-round provision that lowers the conversion price of the Note if the Company issues shares of common stock at a price per share lower than the conversion price then in effect. At December 31, 2022, the conversion price was $6.30 per share. Additionally, the Company extended the July 2019 Note in January 2023, further lowering the conversion price of the Note to $2.87 as of January 31, 2023.

Nomination and Voting Agreement

We are a party to a First Amended and Restated Nomination and Voting Agreement, dated April 16, 2018 (the "Restated Nomination Agreement"), with Boyalife Asset Holding II, Inc., our largest stockholder ("Boyalife"). The Restated Nomination Agreement provides that Boyalife has the right to designate a number of directors of the Company that is in proportion to the "Boyalife Ownership Percentage", which is Boyalife's and its affiliates' combined percentage ownership of outstanding Common Stock, treating as outstanding any shares of Common Stock underlying convertible securities that are immediately exercisable by Boyalife and its affiliates' (including under the Boyalife Note (as defined below)) without any further payment (the "Boyalife Ownership Percentage"). The Restated Nomination Agreement will terminate according to its terms when and if the Boyalife Ownership Percentage falls below 20%.

Lease Agreement

On March 24, 2022, we entered into a Lease Agreement (the "CDMO Facility Lease"), with Z3 Investment LLC ("Lessor") for approximately 35,475 square feet of space in the Sacramento, California area in which we plan to partner with the Lessor to build out into a state-of-the-art current good manufacturing practice (cGMP) compliant facility with 12 cGMP clean room suites (with the Lessor paying to the related build-out costs). The CDMO Facility Lease provides for a lease term beginning on April 1, 2022 and ending on September 30, 2027, with a right of the Company to extend the lease for 2 additional periods of 5 years each. Lessor is an affiliate of our Chairman and CEO, Dr. Xu, and COO, Ms. Zhu. Total payments for the year ended December 31, 2022 were $587,000 and $207,000 for a security deposit.

Director Independence

Our Board of Directors has concluded that Dr. Medford, Dr. Thomis, and Ms. Liu are deemed independent under the Nasdaq rules.

ITEM 14. Principal Accounting Fees and Services

The following table summarizes the fees billed to us by Marcum LLP for the periods indicated below:

Fee Category	Fiscal 2022	Fiscal 2021
Audit Fees(1)	$ 443,000	$ 323,000
Audit-Related Fees	-	-
Tax Fees	-	-
All Other Fees	-	-
Total Fees	$ 443,000	$ 323,000

(1) The audit fees consisted of fees for the audit of our financial statements, the review of the interim financial statements included in our quarterly reports on Form 10-Q, and other professional services provided in connection with statutory and regulatory filings or engagements and capital market financings.

The Audit Committee pre-approves all audit and non-audit services, and has approved all of the foregoing audit and non-audit services, performed by the independent registered public accounting firm in accordance with the Audit Committee Charter.

PART IV

ITEM 15. Exhibits and Financial Statement Schedules

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

Management's Report on Internal Control over Financial Reporting is contained as part of this Annual Report under Item 9A "Controls and Procedures."

(a) (2) Financial Statement Schedules

Financial statement schedules have been omitted because they are not required.

(b) Exhibits

Exhibits required by Item 601 of Regulation S-K are listed in the Exhibit Index on the next page, which are incorporated herein by this reference.

ITEM 16. Form 10-K Summary

None.

EXHIBIT INDEX

Exhibit No.	Description
1.1	At the Market Offering Agreement, dated December 13, 2019, by and between ThermoGenesis Holdings, Inc. and H.C. Wainwright & Co., LLC, incorporated by reference to Exhibit 1.2 to the Registration Statement on Form S-3 (Registration No. 333-235509) filed on December 13, 2019.
1.2	Amendment No.1 to At the Market Offering Agreement dated May 19, 2020, by and between ThermoGenesis Holdings, Inc. and H.C. Wainwright & Co., LLC, incorporated by reference to Exhibit 1.1 to Form 8-K filed May 20, 2020.
1.3	Amendment No. 2 to At the Market Offering Agreement dated May 19, 2020, by and between ThermoGenesis Holdings, Inc. and H.C. Wainwright & Co., LLC, incorporated by reference to Exhibit 1.3 to Form 8-K filed February 3, 2022.
3.1	Amended and Restated Certificate of Incorporation of ThermoGenesis Holdings, Inc. dated as of June 5, 2020, as amended December 21, 2022.
3.2	Amended and Restated Bylaws of ThermoGenesis Holdings, Inc., incorporated by reference to Exhibit 3.2 to Form 8-K filed with the SEC on March 10, 2023.
4.1	Form of Common Stock Purchase Warrant, incorporated by reference to Exhibit 4.1 to Form 8-K filed with the SEC on March 28, 2018.
4.2	Form of Common Warrant, incorporated by reference to Exhibit 10.37 of amended Registration Statement on Form S-1 filed with the SEC on May 14, 2018.
4.3	Investors' Rights Agreement, dated January 1, 2019, among CARTXpress Bio, Inc., Bay City Capital Fund V, L.P., and Bay City Capital Fund V Co-Investment Fund, L.P., incorporated by referenced to Exhibit 10.3 to Form 8-K filed with the SEC on January 4, 2019.
4.4	Description of Securities Registered Under Section 12 of the Securities Exchange Act of 1934, as amended.
4.5	Form of Common Warrant (Incorporated by reference to Exhibit 10.40 to Amendment No. 3 to Form S-1 filed with the SEC on October 17, 2022).
10.1	Form of Stock Option Award Agreement, incorporated by reference to Exhibit 10.1 to Form 8-K filed with the SEC on January 3, 2020.
10.2	Manufacturing and Supply Amending Agreement #1, effective as of March 16, 2020, between ThermoGenesis Corp. and CBR Systems, Inc., incorporated by reference to Exhibit 10.1 to Form 8-K filed with the SEC on March 20, 2020.
10.3	Form of Stock Option Agreement dated as of June 4, 2020, incorporated by reference to Exhibit 10.2 to Form 8-K filed June 9, 2020.
10.4†	Manufacturing and Supply Amending Agreement #2, between ThermoGenesis Holdings, Inc. and CBR Systems dated as of July 13, 2020, incorporated by reference to Exhibit 10.1 to Form 8-K filed July 17, 2020.
10.5	Reorganization and Share Exchange Agreement, dated January 1, 2019, among ThermoGenesis Corp., ThermoGenesis Holdings, Inc., CARTXpress Bio, Inc., Bay City Capital Fund V. L.P. and Bay City Capital Fund V. Co-Investment Fund, L.P., incorporated by referenced to Exhibit 10.1 to Form 8-K filed with the SEC on January 4, 2019.
10.6	Voting Agreement, dated January 1, 2019, among CARTXpress Bio, Inc., ThermoGenesis Corp., Bay City Capital Fund V, L.P., and Bay City Capital Fund V Co-Investment Fund, L.P., incorporated by referenced to Exhibit 10.2 to Form 8-K filed with the SEC on January 4, 2019.
10.7	Right of First Refusal and Co-Sale Agreement, dated January 1, 2019, among CARTXpress Bio, Inc., ThermoGenesis Corp., Bay City Capital Fund V, L.P., and Bay City Capital Fund V Co-Investment Fund, L.P., incorporated by referenced to Exhibit 10.4 to Form 8-K filed with the SEC on January 4, 2019.

10.8	Investors' Rights Agreement, dated January 1, 2019, between CARTXpress Bio, Inc., Bay City Capital Fund V, L.P. and Bay City Capital Fund V Co-Investment Fund, L.P., incorporated by reference to Exhibit 10.3 to Form 8-K filed with the SEC on January 4, 2019.
10.9	Amended and Restated Certificate of Incorporation of CARTXpress Bio, Inc., incorporated by reference to Exhibit 10.5 to Form 8-K filed with the SEC on January 4, 2019.
10.10	Supply Agreement, dated as of August 30, 2019, between Corning Incorporated and ThermoGenesis Holdings, Inc., incorporated by reference to Exhibit 10.1 to Form 8-K filed with the SEC on September 6, 2019.
10.11	Joint Venture Agreement, dated October 21, 2019, between ThermoGenesis Holdings, Inc. and Healthbanks Biotech (USA) Inc., and ImmuneCyte Life Sciences, Inc., incorporated by reference to Exhibit 10.1 to Form 8-K filed with the SEC on October 22, 2019.
10.12	Form of Convertible Promissory Note, dated as of July 23, 2019, between ThermoGenesis Holdings, Inc. and Orbrex USA Co., incorporated by reference to Exhibit 4.1 to Form 8-K filed with the SEC on July 29, 2019.
10.13	Amendment No.1, dated August 12, 2019 but effective as of July 23, 2019, to the Convertible Promissory Note, dated July 23, 2019 between ThermoGenesis Holdings, Inc. and Orbrex (USA) Co. Limited, incorporated by reference to Exhibit 10.4 to Form 10-Q filed with the SEC on August 13, 2019.
10.14#	ThermoGenesis Holdings, Inc. Amended 2016 Equity Incentive Plan, incorporated by reference to Exhibit 10.5 to Form 10-Q filed with the SEC on August 13, 2019.
10.15*	Sixth Amended and Restated Technology License and Escrow Agreement between the Company, ThermoGenesis Corp. and CBR Systems, effective May 15, 2017, incorporated by reference to Exhibit 10.1 to Form 8-K filed with the SEC on May 31, 2017.
10.16#	Amended and Restated 2006 Equity Incentive Plan, incorporated by reference to Exhibit 10.6.1 to Form 8-K filed with the SEC on May 1, 2014.
10.17	Form of Indemnification Agreement, incorporated by reference to Exhibit 10.1 to Form 8-K/A filed with the SEC on November 17, 2016.
10.18#	Form of Notice of Grant of Stock Options and Option Agreement, incorporated by reference to Exhibit 10.1 to Form 8-K filed with the SEC on May 11, 2017.
10.19#	Executive Employment Agreement, dated November 13, 2017, between the Company and Xiaochun Xu, incorporated by reference to Exhibit 10.2 to Form 8-K filed with the SEC on November 15, 2017.
10.20#	Form of Stock Option Agreement, incorporated by reference to Exhibit 10.4 to Form 8-K filed with the SEC on November 15, 2017.
10.21	First Amended and Restated Revolving Credit Agreement, dated April 16, 2018, between Cesca Therapeutics Inc. and Boyalife Asset Holding II, Inc., incorporated by reference to Exhibit 10.1 to Form 8-K filed with the SEC on April 18, 2018.
10.22	Second Amended and Restated Convertible Promissory Note, dated April 16, 2018, issued by Cesca Therapeutics Inc. to Boyalife Asset Holding II, Inc., incorporated by reference to Exhibit 10.2 to Form 8-K filed with the SEC on April 18, 2018.
10.23	Amendment No. 1 to Second Amended and Restated Convertible Promissory Note, dated March 4, 2022, Second Amended and Restated Convertible Promissory Note, dated April 16, 2018, issued by ThermoGenesis Holdings, Inc. to Boyalife Group, Inc., incorporated by reference to Exhibit 10.1 to Form 8-K filed with the SEC on March 8, 2022.
10.24	Amendment No. 2 to Second Amended and Restated Convertible Promissory Note, dated March 6, 2023, between ThermoGenesis Holdings, Inc. and Boyalife Group Inc., incorporated by reference to Exhibit 10.1 to Form 8-K filed with the SEC on March 10, 2023.

10.25	First Amended and Restated Nomination and Voting Agreement, dated April 16, 2018, between Cesca Therapeutics Inc. and Boyalife (Hong Kong) Limited, incorporated by reference to Exhibit 10.3 to Form 8-K filed with the SEC on April 18, 2018.
10.26	Amendment No. 1 to First Amended and Restated Revolving Credit Agreement, dated May 7, 2018, between Cesca Therapeutics Inc. and Boyalife Asset Holding II, Inc., incorporated by reference to Exhibit 10.1 to Form 8-K filed with the SEC on May 7, 2018.
10.27	Amendment No. 2 to First Amended and Restated Revolving Credit Agreement, dated March 4, 2022, between ThermoGenesis Holdings, Inc. and Boyalife Group, Inc., incorporated by reference to Exhibit 10.2 to Form 8-K filed with the SEC on March 8, 2022.
10.28	Amendment No. 3 to First Amended and Restated Revolving Credit Agreement, dated March 6, 2023, between ThermoGenesis Holdings, Inc. and Boyalife Group, Inc., incorporated by reference to Exhibit 10.2 to Form 8-K filed with the SEC on March 10, 2023.
10.29#	Form of Stock Option Agreement, incorporated by reference to Exhibit 10.2 to Form 8-K filed with the SEC on December 19, 2018.
10.30	License and Technology Access Agreement, dated March 24, 2022, between ThermoGenesis Holdings, Inc. and Boyalife Genomics Tianjin Ltd., incorporated by reference to Exhibit 10.1 to Form 8-K filed on March 28, 2022.
10.31	Lease Agreement, dated March 24, 2022, between ThermoGenesis Holdings, Inc. and Z3 Investment LLC, incorporated by reference to Exhibit 10.2 to Form 8-K filed on March 28, 2022.
10.32	Fourth Amendment to the Company's Amended 2016 Equity Incentive Plan, effective June 4, 2020, incorporated by reference to exhibit 10.1 to Form 8-K filed January 14, 2022.
10.33	Amendment No. 2 to Convertible Promissory Note, dated July 25, 2022, between ThermoGenesis Holdings, Inc. and Orbrex (USA) Co. Limited, incorporated by reference to Exhibit 10.1 to Form 8-K filed with the SEC on July 28, 2022.
10.34	Amendment No. 3 to Convertible Promissory Note, dated January 31, 2023, between ThermoGenesis Holdings, Inc. and Orbrex (USA) Co Limited, incorporated by reference to Exhibit 10.1 to Form 8-K filed with the SEC on February 6, 2023.
10.35	Form of Securities Purchase Agreement (Incorporated by reference to Exhibit 10.39 to Amendment No. 3 to Form S-1 filed with the SEC on October 17, 2022).
21.1	Subsidiaries of ThermoGenesis Holdings, Inc., incorporated by reference to Exhibit 21.1 to Form 10-K filed on March 28, 2022.
23.1	Consent of Marcum LLP, Independent Registered Public Accounting Firm
31.1	Certification by the Principal Executive Officer pursuant to Section 302 of the Sarbanes-Oxley Act of 2002
31.2	Certification by the Principal Financial Officer pursuant to Section 302 of the Sarbanes-Oxley Act of 2002
32	Certification of Principal Executive Officer and Principal Financial Officer pursuant to Section 906 of the Sarbanes Oxley Act of 2002
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
101.SCH	Inline XBRL Taxonomy Extension Schema Document
101.CAL	Inline XBRL Taxonomy Extension Calculation Linkbase Document
101.DEF	Inline XBRL Taxonomy Extension Definition Linkbase Document
101.LAB	Inline XBRL Taxonomy Extension Label Linkbase Document
101.PRE	Inline XBRL Taxonomy Extension Presentation Linkbase Document
104	Cover Page Interactive Data File (formatted as Inline XBRL and contained in Exhibit 101)

Footnotes to Exhibit Index

Represents a management contract or compensatory plan, contract or arrangement.

* Confidential treatment has been requested for certain confidential portions of this exhibit pursuant to Rule 24b-2 under the Exchange Act. In accordance with Rule 24b-2, these confidential portions have been omitted from this exhibit and filed separately with the SEC.

† Portions of this exhibit have been redacted because the Company has determined that such information (i) is not material and (ii) would likely cause competitive harm to the Company if it were to be publicly disclosed.

SIGNATURES

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

Dated: March 30, 2023

ThermoGenesis Holdings, Inc.

By:/s/ Xiaochun "Chris" Xu

Xiaochun "Chris" Xu, Chief Executive Officer
(Principal Executive Officer)

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

Pursuant to the requirements of the Securities Exchange Act of 1934, this Annual Report has been signed below by the following persons on behalf of the registrant and in the capacities and on the dates indicated.

By:/s/ Chris Xu — Dated: March 30, 2023
Chris Xu, Chief Executive Officer and Chairman of the Board
(Principal Executive Officer)

By:/s/ Jeffery Cauble — Dated: March 30, 2023
Jeffery Cauble, Chief Financial Officer
(Principal Financial and Principal Accounting Officer)

By: /s/ Vivian Liu — Dated: March 30, 2023
Vivian Liu, Director

By: /s/ Russell Medford — Dated: March 30, 2023
Russell Medford, Director

By: /s/ Joseph Thomis — Dated: March 30, 2023
Joseph Thomis, Director

By: /s/ Haihong Zhu — Dated: March 30, 2023
Haihong Zhu, Director

EXHIBIT 3.1

AMENDED AND RESTATED
CERTIFICATE OF INCORPORATION
OF THERMOGENESIS HOLDINGS, INC.

ThermoGenesis Holdings, Inc., a corporation organized and existing under the laws of the State of Delaware, (the "Corporation") hereby certifies as follows:

1. The original Certificate of Incorporation of the Corporation was filed with the Secretary of State of the State of Delaware on July 3, 1986, under the corporate name Refrigeration Systems International, Inc.

2. This Amended and Restated Certificate of Incorporation was duly adopted by the Board of Directors and stockholders of the Corporation in accordance with Sections 242 and 245 of the Delaware General Corporation Law and restates and integrates and further amends the provisions of the previously filed Sixth Amended and Restated Certificate of Incorporation, as amended, of this Corporation.

3. The Sixth Amended and Restated Certificate of Incorporation, as amended, is hereby amended and restated in its entirely to read as follows:

FIRST: Name. The name of the corporation is: THERMOGENESIS HOLDINGS, INC.

SECOND: Agent for Service. The address, including street, number, city and county, of the registered office of the Corporation in the State of Delaware is 2711 Centerville Road, Suite 400, Wilmington, County of Newcastle, Delaware 19808; and the name of the registered agent of the Corporation in the State of Delaware at such address is The Company Corporation.

THIRD: Purpose. The nature of the business or purposes to be conducted or promoted of this Corporation shall be to engage in any lawful act or activity for which corporations may be organized under the General Corporation Law of Delaware.

FOURTH: Capital Stock.

(a) Authorized Capital Stock. The Corporation is authorized to issue three classes of stock, designated Common Stock, $0.001 par value ("Common Stock"), Class B Common Stock, $0.001 par value ("Class B Common Stock" and together with the Common Stock, "Corporation Common Stock") and Preferred Stock, $0.001 par value ("Preferred Stock"). The total number of shares which the Corporation is authorized to issue is Four Hundred Fifty Two Million (452,000,000). The total number of shares of Common Stock that the Corporation shall have authority to issue is Three Hundred Fifty Million (350,000,000), the total number of shares of Class B Common Stock that the Corporation shall have authority to issue is One Hundred Million (100,000,000) and the total number of shares of Preferred Stock that the Corporation shall have authority to issue is Two Million (2,000,000).

(b) Corporation Common Stock.

(i) Common Stock. A holder of Common Stock shall be entitled to one vote for each share of Common Stock held by such holder of record on the books of the Corporation for all matters on which stockholders of the Corporation are entitled to vote.

(ii) Class B Common Stock. Except as otherwise required by law, the holders of Class B Common Stock shall not be entitled to vote on any matter submitted to a vote of the stockholders of the Corporation.

(iii) Provisions Applicable to All Corporation Common Stock.

(1) *General*. Except as otherwise expressly provided in this Amended and Restated Certificate of Incorporation or as otherwise required by law, all shares of Corporation Common Stock shall have identical powers, rights and privileges in each and every respect. There shall be no cumulative voting.

(2) *Dividends*. Subject to the prior rights and preferences, if any, applicable to shares of Preferred Stock, the holders of Common Stock and the holders of Class B Common Stock shall be entitled to participate ratably, on a share-for-share basis as if all shares of Corporation Common Stock were of a single class, in such dividends, whether in cash, property, stock or otherwise, as may be declared by the Board of Directors from time to time out of assets or funds of the Corporation legally available therefor; provided, however, that any dividends payable in shares of Corporation Common Stock (or payable in rights to subscribe for or to purchase shares of Corporation Common Stock) shall be declared and paid at the same rate on each class of Corporation Common Stock and dividends payable in shares of Common Stock (or rights to subscribe for or to purchase shares of Common Stock) shall only be paid to holders of Common Stock and dividends payable in shares of Class B Common Stock (or rights to subscribe for or to purchase shares of Class B Common Stock) shall only be paid to holders of Class B Common Stock; provided, further, that the Board of Directors may issue shares of Class B Common Stock in the form of a pro rata dividend or distribution to all holders of the outstanding shares of Corporation Common Stock.

(3) *Liquidation*. In the event of any voluntary or involuntary liquidation, dissolution, distribution of all or substantially all of the assets or winding-up of the Corporation, after all creditors of the Corporation shall have been paid in full and after payment of all sums, if any, payable in respect of Preferred Stock, if any, the holders of the Corporation Common Stock shall be entitled to share ratably, on a share-for-share basis as if all shares of Corporation Common Stock were of a single class, in all distributions of assets pursuant to such voluntary or involuntary liquidation, dissolution, distribution of all or substantially all of the assets or winding-up of the Corporation. For purposes of this Section (b)(iii)(3), neither the merger or the consolidation of the Corporation into or with another entity, the conversion of the Corporation into another entity, the merger or consolidation of any other entity into or with the Corporation nor the sale, transfer or other disposition of all or substantially all of the assets of the Corporation shall be deemed to be a voluntary or involuntary liquidation, dissolution, distribution of all or substantially all of the assets or winding-up of the Corporation.

(4) *Split, Subdivision or Combination.* If the Corporation shall in any manner split, subdivide or combine the outstanding shares of Common Stock or Class B Common Stock, the outstanding shares of the other class of Corporation Common Stock shall be proportionally split, subdivided or combined in the same manner and on the same basis as the outstanding shares of the class of Corporation Common Stock that has been so split, subdivided or combined.

(5) *Conversion Rights*. The Corporation Common Stock shall not be convertible into, or exchangeable for, shares of any other class or classes or of any other series of the same class of the Corporation's capital stock.

(c) Preferred Stock. Shares of Preferred Stock may be issued from time to time in one or more series. The Board of Directors shall determine the designation of each series and the authorized number of shares of each series. The Board of Directors is authorized to determine and alter the rights, preferences, privileges and restrictions granted to or imposed upon any wholly unissued series of shares of Preferred Stock and to increase or decrease (but not below the number of shares of such series then outstanding) the number of shares of any such series subsequent to the issue of shares of that series. If the number of shares of any series of Preferred Stock shall be so decreased, the shares constituting such decrease shall resume the status which they had prior to the adoption of the resolution originally fixing the number of shares of such series.

FIFTH: Insolvency; Dissolution. Whenever a compromise or arrangement is proposed between this Corporation and its creditors or any class of them and/or between this Corporation and its stockholders or any class of them, any court or equitable jurisdiction within the State of Delaware may, on the application in a summary way of this Corporation or of any creditor or stockholder thereof or on the application of any receiver or receivers appointed for this Corporation under the provisions of Section 291 of Title 8 of the Delaware Code or on the application of trustees in dissolution or of any receiver or receivers appointed for this Corporation under Section 279 of Title 8 of the Delaware Code order a meeting of the creditors or class of creditors, and/or of the stockholders or class of stockholders of this Corporation, as the case may be, to be summoned in such manner as the said court directs. If a majority in number representing three fourths in value of the creditors or class of creditors, and/or of the stockholders or class of stockholders of this Corporation, as the case may be, agree to: any compromise or arrangement and to any reorganization of this Corporation as consequence of such compromise or arrangement, the said compromise or arrangement and the said reorganization shall, if sanctioned by the court to which said application has been made, be binding on all the creditors or class of creditors, and/or on all the stockholders or class of stockholders, of this Corporation, as the case may be, and also on this Corporation.

SIXTH: Directors. The business and affairs of the Corporation shall be managed by or under the direction of its Board of Directors. The number of directors which shall constitute the entire Board of Directors shall be fixed by, or in the manner provided in, the bylaws of this Corporation. The election of directors of the Corporation need not be by written ballot, unless the bylaws so provide.

SEVENTH: Amendments. The Board of Directors is authorized to adopt, amend or repeal the bylaws of the Corporation. The stockholders shall also have the power to adopt, amend or repeal the bylaws of the Corporation. Notwithstanding, any provision for the classification of directors for staggered terms pursuant to Section 141(d) of the Delaware General Corporation Law shall be set forth in the bylaws adopted by the stockholders unless provisions for such classification shall be set forth in the Corporation's certificate of incorporation.

EIGHTH: Director Liability. A director of the Corporation shall not be personally liable to the Corporation or its stockholders for monetary damages for breach of fiduciary duty as a director except to the extent such exemption from liability or limitation thereof is not permitted under the Delaware General Corporation Law as the same exists or may hereafter be amended.

Any repeal or modification of the foregoing paragraph shall not adversely affect any right or protection of a director of the Corporation existing hereunder with respect to any act or omission occurring prior to such repeal or modification.

NINTH: Indemnification. To the fullest extent permitted by Section 145 of the General Corporation Law of Delaware as the same exists or may hereafter be amended, the Corporation shall indemnify any and all persons whom it shall have power to indemnify under said section from and against any and all of the expenses, liabilities or other matters referred to in or covered by said section, and the indemnification provided for hereby shall not be deemed exclusive of any other rights to which those indemnified may be entitled under any bylaw, agreement, vote of stockholders or disinterested directors or otherwise, both as to any action such person may have performed in current official capacity or in another capacity while holding such office, and shall continue as to any person who has ceased to be a director, officer, employee or agent and shall inure to the benefit of heirs, executors and administrators of such person. No repeal or modification of this Section by the stockholders of the Corporation shall adversely affect any right of protection existing by virtue of this Section at the time of such repeal modification.

IN WITNESS WHEREOF, the Corporation has caused this Amended and Restated Certificate of Incorporation to be signed by its duly authorized officer this 5th day of June 2020.

THERMOGENESIS HOLDINGS, INC.

By: /s/ Xiaochun Xu
Name: Xiaochun (Chris) Xu
Title: CEO & Chairman of the Board

CERTIFICATE OF AMENDMENT TO THE
AMENDED AND RESTATED
CERTIFICATE OF INCORPORATION
OF
THERMOGENESIS HOLDINGS, INC.

Adopted in accordance with the provisions
of Section 242 of the General Corporation
Law of the State of Delaware

ThermoGenesis Holdings, Inc., (the "Corporation"), a corporation organized and existing under the laws of the State of Delaware, by its duly authorized officer, does hereby certify:

FIRST: This Certificate of Amendment (the "Certificate of Amendment") amends the provisions of the Corporation's Amended and Restated Certificate of Incorporation filed with the Secretary of State of the State of Delaware on June 5, 2020 (the "Amended and Restated Certificate of Incorporation").

SECOND: The Amended and Restated Certificate of Incorporation is hereby amended by adding the following paragraph to the end of Article FOURTH thereof as a new Article FOURTH, Section (d):

"(d) Reverse Stock Split. Without regard to any other provision of this Amended and Restated Certificate of Incorporation, effective at 12:01 a.m., eastern time, on December 22, 2022 (the "Effective Time"), the shares of Common Stock issued and outstanding immediately prior to the Effective Time and the shares of Common Stock issued and held in treasury of the Corporation immediately prior to the Effective Time are reclassified into a smaller number of shares such that each forty five (45) shares of issued Common Stock immediately prior to the Effective Time is reclassified into one (1) share of Common Stock. Notwithstanding the immediately preceding sentence, no fractional shares shall be issued and, in lieu thereof, upon surrender after the Effective Time of a certificate which formerly represented shares of Common Stock that were issued and outstanding immediately prior to the Effective Time, any person who would otherwise be entitled to a fractional share of Common Stock as a result of the reclassification, following the Effective Time, shall be entitled to receive one (1) share of Common Stock. Each certificate that immediately prior to the Effective Time represented shares of Common Stock ("Old Certificates"), shall thereafter represent that number of shares of Common Stock into which the shares of Common Stock represented by the Old Certificate shall have been combined, subject to the treatment of fractional shares as described above."

THIRD: This Certificate of Amendment to the Amended and Restated Certificate of Incorporation was duly authorized and adopted by the Corporation's Board of Directors and stockholders in accordance with Sections 228 and 242 of the General Corporation Law of the State of Delaware.

FOURTH: Except as specifically set forth herein, the remainder of the Amended and Restated Certificate of Incorporation will not be amended, modified or otherwise altered.

IN WITNESS WHEREOF, the Corporation has caused this Certificate of Amendment to the Amended and Restated Certificate of Incorporation to be executed by Jeffery Cauble, Chief Financial Officer, this 21st day of December, 2022.

THERMOGENESIS HOLDINGS, INC.

By: /s/ Jeffery Cauble
Jeffery Cauble
Chief Financial Officer

Exhibit 4.4

Description of Securities Registered Under Section 12
of the Securities Exchange Act of 1934, as Amended

Our Certificate of Incorporation authorizes the issuance of up to 350,000,000 shares of common stock, par value $0.001 per share, and 2,000,000 shares of preferred stock, par value $0.001 per share. The rights and preferences of the preferred stock may be established from time to time by our board of directors.

As of December 31, 2022, ThermoGenesis Holdings, Inc. (the "Company," "we," "us," and "our") had one class of securities registered under Section 12 of the Securities Exchange Act of 1934, as amended (the "Exchange Act"), which was its common stock, par value $.001 per share.

The following description of our common stock is a summary and does not purport to be complete. It is subject to and qualified in its entirety by reference to our Certificate of Amendment to the Amended and Restated Certificate of Incorporation, as amended (the "Certificate of Incorporation"), which is filed as Exhibit 3.1 to Form 8-K filed with the SEC on December 21, 2022, and incorporated by reference herein.

Common Stock

Each holder of common stock is entitled to one vote for each share on all matters submitted to a vote of the stockholders, except matters that relate only to one or more of the series of preferred stock, and each holder does not have cumulative voting rights. Accordingly, the holders of a majority of the shares of common stock entitled to vote in any election of directors can elect all of the directors standing for election, if they so choose. According to our Bylaws, all matters are decided by the vote of a majority in voting interest of the stockholders present in person or by proxy and voting at any meeting of the stockholders during which a quorum is present, except as otherwise provided in the Certificate of Incorporation, in the Bylaws or by law.

Subject to preferences that may be applicable to any then outstanding preferred stock, holders of common stock are entitled to receive ratably those dividends, if any, as may be declared from time to time by the board of directors out of legally available funds. In the event of our liquidation, dissolution or winding up, holders of common stock will be entitled to share ratably in the net assets legally available for distribution to stockholders after the payment of all of our debts and other liabilities and the satisfaction of any liquidation preference granted to the holders of any outstanding shares of preferred stock.

Holders of common stock have no preemptive or conversion rights or other subscription rights, and there are no redemption or sinking fund provisions applicable to the common stock. All outstanding shares of common stock are, and the shares of common stock offered by us in this offering, when issued and paid for, will be fully paid and nonassessable. The rights, preferences and privileges of the holders of common stock are subject to, and may be adversely affected by, the rights of the holders of shares of any series of preferred stock which we may designate in the future.

Effect of Certain Provisions of our Certificate of Incorporation and Bylaws and the Delaware Anti-Takeover Statute

Certificate of Incorporation and Bylaws

Some provisions of Delaware law and our Certificate of Incorporation and Bylaws contain provisions that could make the following transactions more difficult:

- acquisition of us by means of a tender offer;
- acquisition of us by means of a proxy contest or otherwise; or
- removal of our incumbent officers and directors.

These provisions, summarized below, are expected to discourage coercive takeover practices and inadequate takeover bids and to promote stability in our management. These provisions are also designed to encourage persons seeking to acquire control of us to first negotiate with our board of directors.

- *Undesignated Preferred Stock*. The ability to authorize undesignated preferred stock makes it possible for our board of directors to issue one or more series of preferred stock with voting or other rights or preferences that could impede the success of any attempt to change control of us. These and other provisions may have the effect of deterring hostile takeovers or delaying changes in control or management of our company.
- *Stockholder Meetings*. Our Bylaws provide that a special meeting of stockholders may be called only by the board of directors.
- *Requirements for Advance Notification of Stockholder Nominations and Proposals*. Our Bylaws establish advance notice procedures with respect to stockholder proposals and the nomination of candidates for election as directors, other than nominations made by or at the direction of our board of directors or a committee of the board of directors.
- *Board of Directors Vacancies*. Under our Bylaws, any vacancy on the board of directors, including a vacancy resulting from an enlargement of the board of directors, may be filled by vote of a majority of the remaining directors. The stockholders may elect a director or directors at any time to fill any vacancy or vacancies not filled by the directors.
- *Board of Directors Size*. Under our Bylaws, the board of directors has the power to set the size of the board. The ability to increase or decrease the size of the board in conjunction with the other provisions above could make it more difficult for a third party to acquire control of the Company.

Delaware Anti-Takeover Statute

We are subject to Section 203 of the Delaware General Corporation Law ("DGCL"). This law prohibits a publicly held Delaware corporation from engaging in any business combination with any interested stockholder for a period of three years following the date that the stockholder became an interested stockholder, unless:

- prior to the date of the transaction, the board of directors of the corporation approved either the business combination or the transaction which resulted in the stockholder becoming an interested stockholder;
- upon consummation of the transaction which resulted in the stockholder becoming an interested stockholder, the interested stockholder owned at least 85% of the voting stock of the corporation outstanding at the time the transaction commenced, excluding for purposes of determining the number of shares outstanding those shares owned by persons who are directors and also officers and by employee stock plans in which employee participants do not have the right to determine confidentially whether shares held subject to the plan will be tendered in a tender or exchange offer; or
- on or subsequent to the date of the transaction, the business combination is approved by the board of directors and authorized at an annual or special meeting of stockholders, and not by written consent, by the affirmative vote of at least two-thirds of the outstanding voting stock which is not owned by the interested stockholder.

Section 203 defines "business combination" to include:

- any merger or consolidation involving the corporation and the interested stockholder;
- any sale, transfer, pledge or other disposition of 10% or more of our assets involving the interested stockholder;
- in general, any transaction that results in the issuance or transfer by us of any of our stock to the interested stockholder; or
- the receipt by the interested stockholder of the benefit of any loans, advances, guarantees, pledges or other financial benefits provided by or through the corporation.

In general, Section 203 of the DGCL defines an "interested stockholder" as an entity or person beneficially owning 15% or more of the outstanding voting stock of the corporation and any entity or person affiliated with or controlling or controlled by the entity or person.

Exhibit 23.1

INDEPENDENT REGISTERED PUBLIC ACCOUNTING FIRM'S CONSENT

We consent to the incorporation by reference in the Registration Statement of ThermoGenesis Holdings, Inc. on Forms S-8 (Files No. 333-233731, 333-227425, 333-218082, 333-206996, 333-187197, 333-171564 and 333-140668), on Forms S-3 (Files No. 333-227426, 333-231526, 333-235509, 333-215638 and 333-212314), and on Forms S-1 (Files No. 333-264242 and 333-224185) of our report dated March 30, 2023, which includes an explanatory paragraph as to the Company's ability to continue as a going concern, with respect to our audits of the consolidated financial statements of ThermoGenesis Holdings, Inc. as of December 31, 2022 and 2021 and for each of the two years ended in the period ended December 31, 2022, which report is included in this Annual Report on Form 10-K of ThermoGenesis Holdings, Inc. for the year ended December 31, 2022.

/s/ Marcum LLP

Marcum LLP
New York, NY
March 30, 2023

Exhibit 31.1

PRINCIPAL EXECUTIVE OFFICER'S CERTIFICATIONS
PURSUANT TO SECTION 302 OF THE SARBANES-OXLEY ACT OF 2002

I, Chris Xu, certify that:

1. I have reviewed this Annual Report on Form 10-K of ThermoGenesis Holdings, Inc.;

2. Based on my knowledge, this Annual Report does not contain any untrue statement of a material fact or omit to state a material fact necessary to make the statements made, in light of the circumstances under which such statements were made, not misleading with respect to the period covered by this Annual Report;

3. Based on my knowledge, the financial statements, and other financial information included in this Annual Report, fairly present in all material respects the financial condition, results of operations and cash flows of the registrant as of, and for, the periods presented in this Annual Report.

4. The registrant's other certifying officer(s) and I are responsible for establishing and maintaining disclosure controls and procedures (as defined in Exchange Act Rules 13a-15(e) and 15d-15(e)) and internal control over financial reporting (as defined in Exchange Act Rules 13a-15(f) and 15d-15(f)) for the registrant and have:

(a) Designed such disclosure controls and procedures, or caused such disclosure controls and procedures to be designed under our supervision, to ensure that material information relating to the registrant, including its consolidated subsidiaries, is made known to us by others within those entities, particularly during the period in which this Annual Report is being prepared;

(b) Designed such internal control over financial reporting, or caused such internal control over financial reporting to be designed under our supervision, to provide reasonable assurance regarding the reliability of financial reporting and the preparation of financial statements for external purposes in accordance with generally accepted accounting principles;

(c) Evaluated the effectiveness of the registrant's disclosure controls and procedures and presented in this Annual Report our conclusions about the effectiveness of the disclosure controls and procedures, as of the end of the period covered by this Annual Report based on such evaluation; and

(d) Disclosed in this Annual Report any change in the registrant's internal control over financial reporting that occurred during the registrant's most recent fiscal quarter (the registrant's fourth fiscal quarter in the case of an annual report) that has materially affected, or is reasonably likely to materially affect, the registrant's internal control over financial reporting; and

5. The registrant's other certifying officer(s) and I have disclosed, based on our most recent evaluation of internal control over financial reporting, to the registrant's auditors and the audit committee of the registrant's board of directors (or persons performing the equivalent functions):

(a) All significant deficiencies and material weaknesses in the design or operation of internal control over financial reporting which are reasonably likely to adversely affect the registrant's ability to record, process, summarize and Annual Report financial information; and

(b) Any fraud, whether or not material, that involves management or other employees who have a significant role in the registrant's internal control over financial reporting.

Dated: March 30, 2023

/s/ Chris Xu
Chris Xu
Chief Executive Officer

Exhibit 31.2

PRINCIPAL FINANCIAL OFFICER'S CERTIFICATIONS
PURSUANT TO SECTION 302 OF THE SARBANES-OXLEY ACT OF 2002

I, Jeffery Cauble, certify that:

1. I have reviewed this Annual Report on Form 10-K of ThermoGenesis Holdings, Inc.;

2. Based on my knowledge, this Annual Report does not contain any untrue statement of a material fact or omit to state a material fact necessary to make the statements made, in light of the circumstances under which such statements were made, not misleading with respect to the period covered by this Annual Report;

3. Based on my knowledge, the financial statements, and other financial information included in this Annual Report, fairly present in all material respects the financial condition, results of operations and cash flows of the registrant as of, and for, the periods presented in this Annual Report.

4. The registrant's other certifying officer(s) and I are responsible for establishing and maintaining disclosure controls and procedures (as defined in Exchange Act Rules 13a-15(e) and 15d-15(e)) and internal control over financial reporting (as defined in Exchange Act Rules 13a-15(f) and 15d-15(f)) for the registrant and have:

(a) Designed such disclosure controls and procedures, or caused such disclosure controls and procedures to be designed under our supervision, to ensure that material information relating to the registrant, including its consolidated subsidiaries, is made known to us by others within those entities, particularly during the period in which this Annual Report is being prepared;

(b) Designed such internal control over financial reporting, or caused such internal control over financial reporting to be designed under our supervision, to provide reasonable assurance regarding the reliability of financial reporting and the preparation of financial statements for external purposes in accordance with generally accepted accounting principles;

(c) Evaluated the effectiveness of the registrant's disclosure controls and procedures and presented in this Annual Report our conclusions about the effectiveness of the disclosure controls and procedures, as of the end of the period covered by this Annual Report based on such evaluation; and

(d) Disclosed in this Annual Report any change in the registrant's internal control over financial reporting that occurred during the registrant's most recent fiscal quarter (the registrant's fourth fiscal quarter in the case of an annual report) that has materially affected, or is reasonably likely to materially affect, the registrant's internal control over financial reporting; and

5. The registrant's other certifying officer(s) and I have disclosed, based on our most recent evaluation of internal control over financial reporting, to the registrant's auditors and the audit committee of the registrant's board of directors (or persons performing the equivalent functions):

(a) All significant deficiencies and material weaknesses in the design or operation of internal control over financial reporting which are reasonably likely to adversely affect the registrant's ability to record, process, summarize and report financial information; and

(b) Any fraud, whether or not material, that involves management or other employees who have a significant role in the registrant's internal control over financial reporting.

Dated: March 30, 2023

/s/ Jeffery Cauble
Jeffery Cauble
Chief Financial Officer

Exhibit 32

CERTIFICATION PURSUANT TO
18 U.S.C. SECTION 1350,
AS ADOPTED PURSUANT TO
SECTION 906 OF THE SARBANES-OXLEY ACT OF 2002

In connection with the Annual Report of ThermoGenesis Holdings, Inc. (the "Company") on Form 10-K for the period ended December 31, 2022, as filed with the Securities and Exchange Commission on the date hereof (the "Annual Report"), each of the undersigned officers of the Company certifies, pursuant to 18 U.S.C. § 1350, as adopted pursuant to § 906 of the Sarbanes-Oxley Act of 2002, that, to such officer's knowledge:

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

(2) The information contained in the Annual Report fairly presents, in all material respects, the financial condition and results of operations of the Company as of the dates and for the periods expressed in the Annual Report.

Dated: March 30, 2023

/s/Chris Xu
Chris Xu
Chief Executive Officer

Dated: March 30, 2023

/s/ Jeffery Cauble
Jeffery Cauble
Chief Financial Officer