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, 2023

☐ **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: **000-55264**

DYADIC INTERNATIONAL, INC.

(Exact name of registrant as specified in its charter)

Delaware	**45-0486747**
(State or other jurisdiction of incorporation or organization)	(I.R.S. Employer Identification No.)

1044 North U.S. Highway One, Suite 201
Jupiter, Florida 33477
(Address of principal executive offices) (Zip Code)

(561) 743-8333
(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, par value $0.001 per share	DYAI	The NASDAQ Stock Market LLC

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 ☐

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

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

Large accelerated filer ☐
Non-accelerated filer ☒
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. ☐

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 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. Yes ☐ No ☒

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

The aggregate market value of the voting and non-voting common equity held by non-affiliates of the registrant (20,274,721 shares) computed by reference to the closing price of $1.93 as reported on the NASDAQ Stock Market on June 30, 2023 (the last business day of the registrant's most recently completed second fiscal quarter) was approximately $39.1 million. Shares of the registrant's common stock held by executive officers, directors, and other affiliates have been excluded from this calculation. This determination of affiliate status is not necessarily a conclusive determination for other purposes.

As of March 27, 2024, the registrant had 28,974,105 shares of common stock outstanding.

DOCUMENTS INCORPORATED BY REFERENCE

The information required by Part III of this Report, to the extent not set forth herein, is incorporated in this Report by reference to the Registrant's definitive proxy statement relating to the 2024 annual meeting of shareholders. The definitive proxy statement will be filed with the Securities and Exchange Commission within 120 days after the end of the 2023 fiscal year.

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CAUTIONARY NOTE REGARDING FORWARD-LOOKING STATEMENTS AND RISK FACTOR SUMMARY

Information (other than historical facts) set forth in this Annual Report on Form 10-K (the "Annual Report" or the "Form 10-K") contains forward-looking statements within the meaning of the Federal securities laws, which involve many risks and uncertainties that could cause our actual results to differ materially from those reflected in the forward-looking statements. Forward-looking statements generally can be identified by use of the words "expect," "should," "intend," "anticipate," "will," "project," "may," "might," "potential," or "continue" and other similar terms or variations of them or similar terminology. Such forward-looking statements are included under Item 7 "Management's Discussion and Analysis". Dyadic International, Inc., and its subsidiaries cautions readers that any forward-looking information is not a guarantee of future performance and that actual results could differ materially from those contained in the forward-looking information. Such statements reflect the current views of our management with respect to our operations, results of operations and future financial performance.

Forward-looking statements involve many risks, uncertainties or other factors beyond Dyadic's control. These factors include, but are not limited to, the items in the following list, which also summarizes some of our more principal risks:

Risks Related to Our Business and Financial Condition

- We may not succeed in implementing our business strategy.
- We have a history of net losses, and we may not achieve or maintain profitability.
- We could fail to manage our growth.
- Our revenue growth depends in part on market and regulatory acceptance of our microbial protein production platforms and other technologies to develop and manufacture animal and/or human biopharmaceutical products and non-pharmaceutical products.
- We may fail to commercialize our microbial protein production platforms or our other technologies for the expression of therapeutic proteins, antibodies, vaccines, and metabolites or other non-pharmaceutical biologic products.
- If our competitors develop technologies and products more quickly and market more effectively than our product candidates, our commercial opportunity will be reduced or eliminated.
- Alternative technologies may not require microbial or other cell produced proteins, such as our proprietary C1 cells and Dapibus™.
- Our SARS-CoV-2 vaccine candidates are at the clinical stage and have not been approved for sale. We have not developed, manufactured or commercialized any vaccine product in the past, and we may be unable to produce a vaccine that can be used to successfully prevent the SARS-CoV-2 virus or its variants of concern, in a timely and economical manner, if at all.
- The results of nonclinical studies and early-stage clinical trials may not be predictive of future results.
- We may need substantial additional capital in the future to fund our business.
- Changes in global economic and financial markets may have a negative effect on our business.
- We face risks related to widespread outbreaks of contagious disease or other biological threats, any of which could significantly disrupt our operations and have a material adverse effect on our business, employees, directors, consultants, collaborators and other third parties, including business development activities and research and development projects conducted by third party contract research organizations parties.
- Our sales and operations are subject to the risks of doing business internationally.
- If we lose key personnel, including key management or board members, or are unable to attract and retain additional personnel, it could delay our technology and product development programs and harm our R&D efforts, and we may be unable to pursue research funding, licenses and other forms of collaborations or develop our own products.
- We may be sued for product liability.
- Foreign currency fluctuations could adversely affect our results.
- Our ability to use our net operating loss carryforwards to offset future taxable income may be subject to certain limitations.
- We may make acquisitions, investments and strategic alliances that may use significant resources, result in disruptions to our business or distractions of our management, may not proceed as planned, and could expose us to unforeseen liabilities.
- We rely significantly on information technology, including artificial intelligence and machine learning, and any failure, inadequacy, interruption or security lapse of that technology, including any cybersecurity incidents, could harm our ability to operate our business effectively.
- Information technology system failures, network disruptions or cyber security breaches could adversely affect our business.
- Changes to our outsourced software or infrastructure vendors as well as any sudden loss, breach of security, disruption or unexpected data or vendor loss associated with our information technology systems could have a material adverse effect on our business.

Risks Related to Dependence on Third Parties

- We are dependent on collaborations with third parties, and if we fail to maintain or successfully manage existing, or enter into new, strategic collaborations, we may not be able to develop and commercialize many of our technologies and products and achieve profitability.
- We have limited or no control over the resources that any collaborator or licensee may devote to our programs, and reductions in collaborators' R&D budgets may affect our businesses.
- We heavily rely on contracts with third-party contract research organizations ("CROs") and other third-party service providers to conduct our research and development, pre-clinical, CMC and cGMP manufacturing, fill and finish, and potential clinical trials, which may not be available to the Company on commercially reasonable terms or at all.
- Conflicts with the CROs, other service providers, collaborators and/or licensees could harm our business.
- We rely on our collaborators and other third parties to deliver timely and accurate information in order to accurately report our financial results as required by law.
- Changes to our outsourced software or infrastructure vendors as well as any sudden loss, breach of security, disruption or unexpected data or vendor loss associated with our information technology systems could have a material adverse effect on our business.

Risks Related to Government Regulations and Environmental, Social, and Governance Issues

- Potential future regulations limiting our ability to sell genetically engineered products could harm our business.
- Public views on ethical and social issues may limit use of our technologies.
- Our results of operations may be adversely affected by environmental, health and safety laws, regulations and liabilities.
- Increasing scrutiny and changing expectations from customers, regulators, investors, and other stakeholders with respect to our environmental, social and governance practices may impose additional costs on us or expose us to new or additional risks.
- We have no experience submitting applications to the FDA or similar regulatory authorities in the past and could be subject to lengthy and/or unfavorable regulatory proceedings.

Risks Relating to Intellectual Property

- Failure to protect our intellectual property and the intellectual property of certain third parties could harm our competitive position.
- Litigation or other proceedings or third-party claims of intellectual property infringement could require us to spend significant time and resources and could prevent us and our collaborators from commercializing our or their technologies and products or negatively impact our stock price.
- Confidentiality agreements with employees and others may not adequately prevent disclosures of trade secrets and other proprietary information.

Risks Related to Our Common Stock

- The price of our shares of common stock is likely to be volatile, and you could lose all or part of your investment.
- Our quarterly and annual operating results may be volatile.
- We do not expect to pay cash dividends in the future.
- Our anti-takeover defense provisions may deter potential acquirers and depress our stock price.
- Concentration of ownership among our existing officers, directors and principal stockholders may prevent other stockholders from influencing significant corporate decisions and depress our stock price.
- Future issuances of shares of our common stock may negatively affect our stock price.
- The Company is exposed to credit risk and fluctuations in the values of its investment portfolio.
- We are a smaller reporting company, and the reduced disclosure requirements applicable to smaller reporting companies may make our common stock less attractive to investors.

We caution you that the foregoing list of important factors is not exclusive. Any forward-looking statements are based on our beliefs, assumptions and expectations of future performance, considering the information currently available to us. These statements are only predictions based upon our current expectations and projections about future events. There are important factors that could cause our actual results, level of activity, performance or achievements to differ materially from the results, level of activity, performance or achievements expressed or implied by the forward-looking statements. New risks emerge from time to time and it is not possible for our management to predict all risks, nor can we assess the impact of all factors on our business or the extent to which any factor, or combination of factors, may cause actual results to differ materially from those contained in any forward-looking statements we may make. Before investing in our common stock, investors should carefully read the information set forth under the caption “Risk Factors” and elsewhere in this Annual Report which could have a material adverse effect on our business, results of operations and financial condition.

You should not rely upon forward-looking statements as predictions of future events. Although we believe that the expectations reflected in the forward-looking statements are reasonable, we cannot guarantee that the future results, levels of activity, performance and events and circumstances reflected in the forward-looking statements will be achieved or occur. Except as required by law, we undertake no obligation to publicly update any forward-looking statements for any reason after the date of this Annual Report to conform these statements to actual results or to changes in our expectations.

We qualify all our forward-looking statements by these cautionary statements. In addition, with respect to all our forward-looking statements, we claim the protection of the safe harbor for forward-looking statements contained in the Private Securities Litigation Reform Act of 1995.

PART I

Item 1. Business

Overview

Dyadic International, Inc. ("Dyadic", "we", "us", "our", or the "Company") is a global biotechnology platform company based in Jupiter, Florida with operations in the United States and a satellite office in the Netherlands, and it utilizes several third-party consultants and research organizations to carry out the Company's activities. Over the past two plus decades, the Company has developed a gene expression platform for producing commercial quantities of industrial enzymes and other proteins, and has previously licensed this technology to third parties, such as Abengoa Bioenergy SA, BASF SE, Codexis, Inc. and others, for use in industrial (non-pharmaceutical) applications. This technology is based on the *Thermothelomyces heterothallica* (formerly known as *Myceliophthora thermophila*) fungus, which the Company named C1.

On December 31, 2015, the Company sold its industrial technology business to Danisco USA ("Danisco"), the industrial biosciences business of DuPont (NYSE: DD) (the "DuPont Transaction"). As part of the DuPont Transaction, Dyadic retained co-exclusive rights to the C1-cell protein production platform for use in all human and animal pharmaceutical applications, and currently, the Company has the exclusive ability to enter into sub-license agreements (subject to the terms of the license and to certain exceptions) for use in all human and animal pharmaceutical applications. Danisco retained certain rights to utilize the C1-cell protein production platform in pharmaceutical applications, including the development and production of pharmaceutical products, for which it will be required to make royalty payments to Dyadic upon commercialization. In certain circumstances, Dyadic may owe a royalty to either Danisco or certain licensors of Danisco, depending upon whether Dyadic elects to utilize certain patents either owned by Danisco or licensed in by Danisco.

After the DuPont Transaction, the Company has been focused on building innovative microbial protein production platforms to address the growing demand for global protein bioproduction utilizing its advanced microbial platforms to develop and manufacture prophylactic, therapeutic, and nutritional biopharmaceutical products for human and animal health and wellness.

Our Technology

Our mission is to leverage our proprietary highly productive, and scalable microbial fungal protein production platforms to meet the growing demand for proteins in both human and animal health markets worldwide. Additionally, we aim to enable the rapid development and large-scale manufacturing of cost-effective proteins, metabolites, and other biologic products, extending beyond pharmaceutical applications in areas such as food, nutrition, and wellness.

The C1-cell protein production platform is a versatile thermophilic filamentous fungal expression system customized for the development and production of biologic products including enzymes and other proteins for human and animal health. Potential applications to be produced from C1-cells include protein antigens, ferritin nanoparticles, virus-like particles ("VLPs"), monoclonal antibodies ("mAbs"), Bi/Tri-specific antibodies, Fab antibody fragments, Fc-fusion proteins, as well as other therapeutic enzymes and proteins. The Company participates in multiple funded research collaborations with certain leading animal and human pharmaceutical companies. These partnerships are strategically engaged to leverage the potential of our C1-cell protein production platform in the development of innovative vaccines and drugs, as well as biosimilars and/or biobetters, which we believe will contribute to advancements in medical science and healthcare.

The Company also developed the Dapibus™ thermophilic filamentous fungal-based microbial protein production platform to enable the rapid development and large-scale manufacture of cost-effective proteins, metabolites, and other biologic products for use in non-pharmaceutical applications, including food, nutrition, and wellness.

We believe that our microbial cell line possesses distinctive characteristics compared to conventional filamentous fungal cells. Moreover, we believe that our protein production platforms offer potential competitive advantages in the discovery, development, and manufacturing of biologic medicines and vaccines, compared to certain other legacy biopharmaceutical expression systems, which include but are not limited to:

Purity
- High retention of target secreted protein through downstream processing
- No requirement for viral (i.e., CHO and Baculovirus) or endotoxin (i.e., *E. coli*) removal

High Productivity
- Robust and versatile growth conditions High yields of secreted protein
- Low viscosity due to C1's unique morphology

Robustness
- Proven at both small and large scale, ranging from laboratory microtiter plates, shaker flasks, single use and/or stainless-steel microbial fermenters Stable and correctly folded monoclonal antibodies (mAbs), having binding, neutralizing and certain other properties similar to CHO produced mAbs

Speeds

Develop stable C1-cell lines for protein production in ~ 60 days

Production time savings of ~30 days over CHO-cell production (C1: 12-14 days vs. CHO 41-54 days) Manufacturing ~ 3-4 batches of C1 produced mAbs in the same time it takes to make 1 batch using CHO-cells

Faster product release –No requirement for viral (i.e., CHO and Baculovirus) or endotoxin (i.e., E. coli) removal allowing for earlier product release

Costs

High yields and rapid manufacturing cycle times reduce costs and shrink manufacturing footprint

C1-cells can be grown using low-cost and readily available cGMP media; C1 media < 1/20 of the cost of CHO cell media

No requirement for viral or endotoxin removal, which simplifies processing compared to CHO, Baculovirus and E. coli, saving time and money

Competition

The biotechnology and biopharmaceutical industry is intensely competitive. There is continuous demand for innovation and speed, and as the vaccine and therapeutic markets evolve, there is always the risk that a competitor may be able to develop other compounds or drugs that are able to achieve similar or better results for indications. Potential competition includes major multinational pharmaceutical companies, established biotechnology companies, specialty pharmaceutical companies, universities, and other research institutions. Many of these competitors have substantially greater financial, technical, and other resources, such as larger research and development staff and experienced marketing and manufacturing organizations with established sales forces. Smaller or early-stage companies may also prove to be significant competitors, particularly through collaborative arrangements with large, established companies.

Currently, we are not aware of other companies pursuing a business model similar to what we are developing under our microbial filamentous fungal-based protein production platform. However, our competitors using other protein production platforms who are significantly larger and better capitalized than us, could potentially adopt strategies similar to our and even implement them at a faster pace. These potential competitors include multinational pharmaceutical companies, established biotechnology companies, specialty pharmaceutical companies, universities, governmental agencies, and other research institutions that are operating in the human health and animal health fields. Moreover, smaller or early-stage companies may emerge as significant competitors, particularly through collaborative arrangements with large, established companies. Unlike in human and animal health, several other companies have and are actively engaged in utilizing filamentous fungal microorganisms for the development and manufacture of low-cost proteins, metabolites, and other biological products for use in non-pharmaceutical applications, such as food, nutrition, and wellness.

We believe that our microbial fungal based protein production platforms, including C1 and Dapibus™, have significant potential to become an alternative to several traditional production technologies currently used in the biopharmaceutical industry to produce vaccines, monoclonal antibodies, and other therapeutic proteins for both the human and animal health markets. C1 has some inherent benefits and potential competitive advantages compared to CHO cells, *E. coli*, Pichia, and Insect Cells (i.e., Baculovirus) as discussed below:

- Mammalian cells: Currently the preferred production host for most complex protein therapeutics due mainly to their ability to produce proteins with human-like glycosylation. This market is dominated by CHO cells. Disadvantages include the longer duration required for cell line development, fermentation, and increased costs associated with process media.
- Bacterial: Bacteria such as *E. coli* are currently the easiest, cheapest, and quickest method for recombinant protein expression and are often used in laboratory settings as well as commercial production of certain non-glycosylated proteins. However, they produce toxic and pyrogenic cell wall components that may make them less suitable to produce biopharmaceuticals or food components. Moreover, insoluble expression, a frequent outcome in bacterial expression, is challenging with regard to cost of goods due to the need for refolding and its direct impact on reduced overall yields.
- Yeast: In contrast to bacteria, yeast, such as *Pichia pastoris*, do not produce potentially toxic and pyrogenic cell wall components. Further, the genetic tools for yeast development are advanced and enable continued engineering of new strains that may become more suitable than CHO cell lines. Disadvantages include the typically lower protein titers than C1-cells and traditional yeast cells have a greater number of higher N and O glycosylation structures.
- Insect cells: Insect cells (i.e., Baculovirus) offer protein expression with post-translational modifications like mammalian cells, ease of scale-up, and simplified cell growth readily adapted to high-density suspension culture for large-scale expression. Baculovirus expression systems are used for producing recombinant protein, especially for vaccine antigens. Disadvantages include the comparably lower protein yields than C1 and the need for an added viral inactivation step.

We believe that our microbial protein production platforms hold the potential to become leading protein production platforms for developing and manufacturing proteins across various sectors, including biopharmaceuticals, food, nutrition, wellness, drug formulation, and research diagnostics, based on our platform's capability to expedite development processes, achieve high protein yields, scale efficiently, utilize low-cost media, and ultimately reduce production costs.

Our Industry and Potential Markets

Based on feedback received from our collaborators and our ongoing discussions with leading pharmaceutical and biotech companies, contract manufacturing organizations (CMOs), leading academic institutions, as well as U.S. and foreign governmental agencies, we continue to believe that the biopharmaceutical market is an attractive opportunity to apply our C1-cell protein production platform. The Company continues to evaluate potential opportunities to expand the application of our C1-cell protein production platform, and is currently focused on the following markets:

- Recombinant vaccines and drugs for animal and human health
- New innovative biotherapeutics
- Biosimilars / Biobetters non-Glycosylated/Glycosylated protein markets
- Drug formulation, research diagnostic and reagents
- Alternative proteins for food, health and wellness

The use of biologic medicines, for applications such as infectious disease vaccines and therapeutics are growing significantly. However, biologic medicines are in many cases limited and expensive for both patients and health care systems. The Company believes that lack of access and high cost is, in part, the result of the following bottlenecks in the development and manufacture of biologic medicines:

- Extended stable cell line development timelines
- Insufficient titers and overall yields
- Expensive, often royalty stacked, production media in the case of CHO cell lines
- Long production time for stable CHO cell lines
- Previously underfunded development efforts for more efficient next-generation gene expression systems

The Company believes that the biopharmaceutical industry can benefit from an innovative protein production platform that is safe, efficient, reliable, and cost effective. Such a platform could facilitate the rapid and high titer production of difficult to express proteins resulting in greater patient access and more affordable biopharmaceuticals. We believe that our C1-cell protein production platform has the potential to be an alternative to CHO, Baculovirus and other traditional expression systems to produce proteins for vaccines, therapeutics, diagnostics, alternative foods, nutrition and wellness and other biological products.

Our Research Partners and Contract Research Organizations (CROs)

Currently, the Company is conducting its C1-cell protein production platform research and other internal and external third-party programs with several contract organizations as follows:

(1) Research and Development Agreement with VTT Technical Research Centre of Finland, Ltd ("VTT")

Since September 2016, the Company has been working with VTT Technical Research Centre of Finland, Ltd. ("VTT"), a third-party contract research organization, to further modify and improve the Company's C1-cell protein production platform to ensure a safe and efficient expression system for use in speeding up the development and lowering the cost of manufacturing pharmaceutical products and processes. VTT is one of the leading research and technology organizations in Europe, and it has conducted research and development on fungi and other microorganisms for more than three decades. VTT is continuing their development work to further develop our C1-cell protein production platform.

The Company has extended its research contract with VTT multiple times to continue developing Dyadic's C1-cell protein production platform for therapeutic protein production, including C1 host system improvement, glycoengineering, protease deletion, and management of third-party target protein projects. A significant portion of the research and development activities at VTT are being funded by the Company's third-party collaborators.

(2) Other CROs and cGMP Manufacturers

The Company works with several other research providers, cGMP manufacturers, and contract research organizations from time to time, which are important to achieve the Company's scientific and business objectives. These entities include but are not limited to CR2O, a contract research organization, to manage and support further preclinical and clinical development of DYAI-100, and Eleszto Genetika (Budapest, Hungary).

These arrangements are typically work for hire on an as-needed basis, however, certain of these programs, if negatively impacted due to resource availability, disagreements, or for other reasons could lead to delays or inability to realize our research and commercial objectives. The Company, supplemented by third party funding is also further developing its Dapibus™ protein production platform for use in non-pharmaceutical applications, such as food, nutrition, and wellness.

Our Research and Development ("R&D") Programs

(1) Internal Research Programs

C1 Production Host Improvement Programs

The Company has research and development agreements with VTT, Eleszto Genetika (Budapest, Hungary), other CROs and service and technical providers to further improve its C1-cell protein production platform to become an even more robust, versatile, and efficient therapeutic protein production platform. Ongoing projects include, among others: (i) improving the C1 genetic tools, (ii) further reducing the background protease(s) levels by identifying and deleting certain protease genes and/or modifying C1 fermentation processes, (iii) developing high expression C1 cell lines by precision engineering, (iv) developing C1 cell lines to express several potential vaccine and drug candidates and (v) modifying the glycosylation pathway of C1 cells in order for C1 to express certain mAbs and other proteins with mammalian like glycosylation structures and to eliminate or modify certain unwanted glycan structures such as N and O-glycosylation.

We continue to generate a growing amount of data that demonstrates different C1-produced proteins are properly folded and are biologically active:

- Further development of DYAI-100 (SARS-CoV-2 RBD) vaccine candidate by preparing C1 cell lines that express and produce effective antigens against different variants of the SARS-CoV-2 RBD in order to implement the FDA recommendation to produce annual multivalent vaccines against SARS-CoV-2 that are suitable for the annual global threat.
- Developing additional antigens that were produced by C1 (e.g., SARS-CoV-2 Full Spike Protein, hemagglutinin (HA) and Neuraminidase (NA)) which were not only produced at high levels, but they were also importantly shown to be safe, effective, and protective in several animal trials and in the case of influenza a challenge test carried out by Oslo University demonstrated the potential of C1 produced antigens for seasonal and pandemic influenza.

- Developing C1-cells to express complex proteins such as conjugating antigens to ferritin nanoparticles, scFv (MHCII) and trimerization domains to increase efficacy.
- Developing the C1-cell protein production platform for expressing mAbs at relatively high levels and high quality (e.g., data from more than one large pharma collaborator demonstrated that the binding kinetics of mAbs produced from C1 are virtually indistinguishable from the binding kinetics of reference mAbs which were produced in CHO cells).
- Success in glycoengineering C1 cells to express mAbs that have human-like glycan structures.
- Expressed a number of third-party monoclonal antibodies (mAbs) which were assayed by multiple third parties who reported that the neutralizing and binding activity assays demonstrated great similarity between C1-produced mAb and CHO-produced mAbs.
- Expressed a number of other types of therapeutic proteins, such as bi-specifics, tri-specifics and Fc-fusion proteins, at relative high yields compared to other production hosts and high quality (e.g., expressed a third party bi-specific antibody which was assayed by the third party in an in vitro cellular activity assay which indicated that dose response curves for the C1 expressed bi-specific antibody were very similar to the CHO expressed bi-specific antibody).
- Developed the C1-cell protein production platform to express human and bovine serum albumin and other recombinant proteins with therapeutic, drug formulation, and research diagnostic applications.

Glycosylated Therapeutic Programs and Potential Nivolumab Commercialization Program

The Company's longer-term objective, which will require substantially more time and capital, is to apply the C1-cell protein production platform for the large therapeutic glycoprotein market. We believe that the rapid advances being made in genomics and synthetic biology, make the C1 fungal cell line a promising candidate to further engineer glycosylation pathways: (i) to produce therapeutic proteins having human-like glycoforms structures such as G0, G2, G0F, and G2F; (ii) to reduce or eliminate O-glycosylation; and (iii) to create potentially improved immunogenicity in the case of vaccines.

The initial steps to develop C1 strains that produce mAbs with mammalian-like glycosylation are progressing at VTT. Based on research results we have to date, the Company believes that our C1-cell protein production platform has the potential to become a useful platform for the development and production of therapeutic glycoproteins with human-like or potentially even superior glycan structures. We believe that, if successful, the glycoengineering of C1 cells may help to position the C1 protein production platform to be an important production platform for developing and manufacturing glycosylated antibodies and other glycoproteins. These initial glycoengineered C1 cells have to date shown reduced gene expression levels when compared to the non-glycoengineered C1 cells. Several approaches are now being applied to reach our main goal – to develop cell line(s) that resemble the 3 main goals: (i) to produce therapeutic proteins having human-like glycoform structures, (ii) to produce therapeutic proteins at high level and (iii) to produce stable therapeutic proteins.

We continue the development of Nivolumab (Opdivo®) as a potential biosimilar/biobetter immunotherapeutic biologic drug for human metastatic cancers, including melanoma, lung, and other cancers. The aim of this program is to express Nivolumab (mAb) with a glycoprotein structure like Nivolumab produced in CHO cells. So far, C1 produced Nivolumab has been produced with similar glycosylated structures and the development of high producing C1 cell line that expresses a lower cost biosimilar/Biobetter Nivolumab as part of its glycoengineering program for glycoprotein Immunoglobulin G (IgG) monoclonal antibodies is ongoing. This project has proved the concept that C1-cell protein production platform can be applied to several very high value therapeutic or preventative monoclonal antibodies.

(2) Pharmaceutical Programs

DYAI-100, a C1-SARS-CoV-2 recombinant protein RBD vaccine candidate, is the first C1-expressed protein tested in humans. The Phase 1 randomized, double-blind, placebo-controlled trial was designed as a first-in-human trial to assess the clinical safety and antibody response of DYAI-100, produced using the C1 platform and administered as a booster vaccine at two single dose levels in healthy volunteers. Following the regulatory clearance from the South African Health Products Regulatory Authority (SAHPRA), the trial was initiated in 1Q 2023 with the last patient visit occurring in 3Q 2023. On November 29, 2023, the Company announced the top-line safety results, indicating that the study had met its primary endpoint that both the low and high dose levels of the vaccine are safe and well tolerated among participants. Additionally, the vaccine has been shown to induce immune responses at both dose levels, suggesting its potential efficacy in generating protective immunity against the target virus.

On March 25, 2024, the Company entered into a funded research collaboration with a top ten pharmaceutical company to develop a vaccine antigen and a monoclonal antibody produced from the C1 technology.

On March 15, 2024, the Company expanded its collaboration with Phibro Animal Health/Abic Biological Laboratories Ltd to develop vaccines and treatments for companion and livestock animal diseases.

In March 2024, a manuscript of preclinical studies on C1 produced monoclonal antibody in non-human primates and hamsters was published in the prestigious peer-reviewed journal Nature Communications. A non-human primate challenge study completed dosing of a C1 produced COVID-19 monoclonal antibody that had previously demonstrated broad neutralization and protection against Omicron (BA.1 and BA.2) and the other earlier variants of concern in hamsters. Preliminary results obtained from the challenge study with the SARS-CoV-2 Delta virus on non-human primates demonstrated potential high protection. This was the first time a C1-produced monoclonal antibody was used in a non-human primate study validating the safety and efficacy of a C1 produced antibody for infectious diseases.

At the NIIMBL conference in February 2024, the Company showcased our project data and research results generated from the NIIMBL Grant received by the Company under the previously announced White House's American Rescue Plan.

On February 28, 2024, the Company's Dutch subsidiary, Dyadic Nederland BV, entered into a strategic partnership agreement and collaboration with Rabian BV ("Rabian"), a Dutch innovative SME founded by experienced entrepreneurs and vaccine scientists. Awarded by Eurostars for the AVATAR project, a part of the European Partnership on Innovative SMEs, and co-funded by the European Union through Horizon Europe, Rabian will use the total funding leveraging its expertise in virology to develop a rabies vaccine using Dyadic's C1 protein production platform to tackle the challenges posed by rabies, particularly in lower- and middle-income countries. Dyadic is expected to receive an equity stake in Rabian, fully funded research and development costs, and specified product milestones and royalties upon commercialization.

On February 21, 2024, the Company announced it has advanced its collaboration with the Israel Institute for Biological Research (IIBR) and its commercial arm Life Science Research Israel (LSRI), to target emerging disease solutions. This partnership aims to leverage Dyadic's expertise in microbial platforms for flexible scale protein bioproduction and the IIBR's antibodies and antigens discovery capabilities to develop and manufacture innovative solutions for addressing emerging diseases and potential bio-threats. Through this collaboration, both parties are working towards the development of effective treatments and vaccines to combat global health challenges with the intention of future commercialization (to date, the framework is non-binding and subject to the execution of a binding agreement to be negotiated by the parties) through collaborative out-licensing initiatives.

On February 13, 2024, the Company announced a strategic partnership with Cygnus Technologies®, part of Maravai LifeSciences® (Nasdaq: MRVI), which has developed the C1 Host Cell Protein ELISA Kit for the quality release of products produced using Dyadic's protein expression platforms.

On February 6, 2024, the Company announced it has signed a fully funded evaluation agreement including a commercial option with an undisclosed leading global biopharmaceutical company to design and produce recombinant proteins using Dyadic's C1 filamentous fungal-based microbial protein production platform.

On October 25, 2023, the Company announced that it has entered into a new research collaboration with the Vaccine and Immunotherapy Center ("VIC") at Massachusetts General Hospital to express vaccine antigens for influenza A and other infectious diseases, as part of VIC's $5.88 million award from the Department of Defense ("DoD").

On September 26, 2023, the Company entered into a development and commercialization agreement with bYoRNA combining bYoRNA's novel eukaryotic "bio" RNA platform with Dyadic's industrially proven C1 protein production platform to provide the pharmaceutical industry with a potentially more cost-efficient platform for manufacturing large quantities of lower cost mRNA, enabling access to mRNA vaccines and drugs to a broader global population.

Rubic One Health, South Africa

In April 2023, the Company expanded the license agreement with South Africa's Rubic One Health ("Rubic") to include vaccines and therapeutic proteins beyond COVID-19 for both human and animal health markets. This is a collaboration to develop end-to-end solutions to develop, manufacture, commercialize, and distribute affordable vaccines and biologics for human and animal health in underserved African countries. Tech transfer of the C1-cell protein production platform has been completed. Under the license agreement, Dyadic is expected to receive certain marketing rights and other considerations, including milestones and royalty payments, from Rubic.

Phibro/Abic Sublicense Agreement

On February 8, 2022, the Company entered into an exclusive sublicense agreement with Abic Biological Laboratories Ltd. ("Abic"), an affiliate of Phibro Animal Health Corporation ("Phibro"), based on an existing July 1, 2020, non-exclusive sublicense and development agreement (the "Phibro/Abic Agreement"), to provide services for a targeted disease. Since then, the Company has expanded the Phibro/Abic Agreement to include additional research projects to develop vaccines and treatments for companion and livestock animal diseases.

(3) Non-pharmaceutical Programs

Dyadic's newly developed Dapibus™ filamentous fungal based microbial protein production platform is reengineered to enable the rapid development and large-scale manufacture of low-cost proteins, metabolites, and other biologic products for use in non-pharmaceutical applications, such as food, nutrition, and wellness. Given Dyadic's industrial heritage, the expertise to rapidly achieve commercial scale within margin sensitive markets such as food and nutrition enzymes, provides our partners with the ability to move from demonstration to commercial production quickly and efficiently. We are actively applying our proprietary Dapibus™ platform and other technologies to address the unmet need to reduce the production cost in the global market for non-pharmaceutical recombinant proteins.

Cell Culture Media Products

- Recombinant Serum Albumin: In March 2024, the Company executed a term sheet with a global albumin manufacturer and distributor to develop and license Dyadic's recombinant serum albumin initially for diagnostic and research-grade purposes. The Company's animal-free recombinant serum albumin projects were initiated in late 2022 using Dyadic pharmaceutical cell lines for use in potential therapeutic, product development, research, and/or diagnostic human and animal pharmaceutical applications. Animal-free recombinant serum albumin projects were initiated for use in potential non-pharmaceutical applications such as a component of cell culture media in nutrition, health, and food. The Company has completed the initial analysis of its recombinant albumin products and has Certificates of Analysis for recombinant human and bovine albumin that demonstrate comparability to reference standards used in the testing.
- In March 2024, the Company entered into a co-promotion agreement with Biftek Co. for the promotion of growth media supplement for cell culture.
- The Company has commenced a development program to produce recombinant transferrin for use in cell culture media for the alternative protein industry, and initial production via our microbial platform was successful.
- The Company is currently providing samples of recombinant bovine serum albumin for application testing as growth media for the cultured meat industry.

Non-animal Dairy Products

- In September 2023, the Company entered into a development and exclusive license agreement to commercialize certain non-animal dairy enzymes used in the production of food products using Dapibus™ and received an upfront payment of $0.6 million in October 2023. The Company believes it has achieved the specified target yield level required for a milestone payment.
- The Company has developed a highly productive strain and is providing samples of recombinant alpha-lactalbumin, a whey protein, to interested collaborators.
- The Company has initiated a beta-lactoglobulin animal-free recombinant whey protein project in early 2024.
- The Company has commenced a recombinant lactoferrin development program and expects to provide samples of the product in the third quarter of 2024.
- The Company has expressed four casein proteins and is in active discussions with potential collaborators.

Bio Industrial Products

- The Company has developed several enzymes that have the potential for use in multiple industries, such as nutrition, biofuels and biorefining.

Other Events

- On March 8, 2024, the Company issued an aggregate principal amount of $6.0 million of its 8.0% Senior Secured Convertible Promissory Notes due March 8, 2027 (the "Convertible Notes") in a private placement in reliance on the exemption from registration provided by Section 4(a)(2) of the Securities Act of 1933, as amended. The purchasers of the Convertible Notes include immediate family members and family trusts related to Mark Emalfarb, our President and Chief Executive Officer and a member of our Board of Directors, including The Francisco Trust, an existing holder of more than 5% of the Company's outstanding common stock.

- For the year ended December 31, 2023, the Company received approximately $1.3 million from the sale of its equity interest in Alphazyme LLC ("Alphazyme"). Dyadic previously received its equity as part of the consideration for the grant of a non-exclusive license to certain of Dyadic's technology. Dyadic has the right to receive milestone and royalty payments based on potential sales of C1-expressed products by Alphazyme. Dyadic also has the potential to receive additional payments based on future sales of Alphazyme's existing products.

- In April 2023, the Company received a Notice of Allowance from the U.S. Patent and Trademark Office (USPTO) for patent application 16/640,483, titled "PRODUCTION OF FLU VACCINE IN MYCELIOPHTHORA THERMOPHILA" (the "Patent"), and is expected to provide patent protection through 2038. The Patent will cover claims for the development and manufacture of seasonal and pandemic influenza vaccines from the Company's C1 protein production platform.

Government Regulation and Product Approval

As a small biotechnology company that operates in the United States, we are subject to extensive regulation. Government authorities in the United States (at the federal, state and local level) and in other countries extensively regulate, among other things, the research, development, testing, manufacturing, quality control, approval, labeling, packaging, storage, record-keeping, promotion, advertising, distribution, post-approval monitoring and reporting, marketing and export and import of drug products such as those we are developing. Product candidates that we develop must be approved by the FDA, before they may be legally marketed in the United States and by the appropriate foreign regulatory agency before they may be legally marketed in foreign countries. Generally, our activities in other countries will be subject to regulation that is similar in nature and scope as that imposed in the United States, although there can be important differences. For additional discussion on the effect of existing or probable governmental regulations on our business, see "Risk Factors—Risks Related to Government Regulations and Environmental, Social, and Governance Issues."

Employees

As of December 31, 2023, the Company had 7 full-time employees, all of whom are located in the United States.

Intellectual Property

Patents are important to developing and protecting our competitive position. Our general policy is to seek patent protection in the United States, major European countries, and other jurisdictions as appropriate for our compounds and methods. U.S. patents, as well as most foreign patents, are generally effective for 20 years from the date the earliest patent application was filed. In some cases, the patent term may be extended to recapture a portion of the term lost during the U.S. FDA regulatory review or because of U.S. Patent and Trademark Office ("USPTO") delays in prosecuting the application. The duration of foreign patents varies similarly, in accordance with local law.

Currently, Dyadic owns or has exclusive rights to seven (7) patent families, of which five (5) entered the national phase. The other two (2) applications are at the international (Patent Cooperation Treaty, PCT) phase. There are currently one (1) patent and five (5) pending patent applications in the United States, one patent in South Africa, and eighteen (18) additional patent applications in a variety of jurisdictions including Europe and China.

Our success is significantly dependent on our ability to obtain and maintain patent protection for C1 and Dapibus™, both in the United States and abroad. Our patent position and proprietary rights are subject to various risks and uncertainties. Please read the "Risk Factors" in Item 1A of this Annual Report for information about certain risks and uncertainties that may affect our patent position and proprietary rights.

We also rely upon unpatented confidential information to remain competitive. We protect such information principally through confidentiality agreements with our employees, consultants, outside scientific collaborators, and other advisers. In the case of our employees, these agreements also provide, in compliance with relevant law, that inventions and other intellectual property conceived by such employees during their employment shall be our exclusive property.

Available Information

Information that we furnish to or file with the SEC, including the Company's annual reports on Form 10-K, quarterly reports on Form 10-Q, current reports on Form 8-K and any amendments to, or exhibits included in, these reports are made available for download, free of charge, through the Company's website at www.dyadic.com as soon as reasonably practicable. The Company's SEC filings, including exhibits filed therewith, are also available directly on the SEC's website at www.sec.gov.

The Company may use its website as a distribution channel of material company information. Financial and other important information regarding the Company is routinely posted on and accessible through the Company's website. Accordingly, investors should monitor this channel, in addition to following the Company's press releases, SEC filings and public conference calls and webcasts. Information contained on the Company's website is not part of this report.

Item 1A. Risk Factors

Investing in our common stock involves a high degree of risk. You should carefully consider the following material risks, together with the other matters described in this Annual Report and in our financial statements and the related notes thereto in evaluating our current business and future performance. We cannot assure you that any of the events discussed in the risk factors below will or will not occur. If we are not able to successfully address any of the following risks, we could experience significant changes in our business, operations and financial performance. In such circumstances, the trading price of our common stock could decline, and in some cases, such declines could be significant, and you could lose part or all of your investment. In addition to the risks described below, other unforeseeable risks that we currently believe are immaterial may arise that adversely affect our operating results. Certain statements contained in this Annual Report (including certain statements used in the discussion of our risk factors) constitute forward-looking statements. Please refer to the section entitled "Cautionary Note Regarding Forward-Looking Statements" appearing on page [4] of this Annual Report for important information regarding reliance on forward-looking statements.

Risks Related to Our Business and Financial Condition

We may not succeed in implementing our business strategy.

In connection with the December 31, 2015 sale of substantially all of the assets of our industrial technology business to Danisco (the "DuPont Transaction"), Danisco obtained certain rights to utilize the C1-cell protein production platform for development and production of pharmaceutical products, for which it will make royalty payments to Dyadic upon commercialization. At the same time, Dyadic retained the co-exclusive rights to the C1-cell protein production platform for use in all human and animal pharmaceutical applications, with Dyadic currently having the exclusive ability to enter into sub-license agreements in that field (subject to the terms of the license and certain exceptions). We cannot predict whether Danisco intends to or will pursue the use of the C1-cell protein production platform to develop or manufacture pharmaceutical products or whether or when we might receive royalties from Danisco. In certain circumstances, Dyadic may owe a royalty to either Danisco or certain licensors of Danisco, depending upon whether Dyadic elects to utilize certain patents owned or licensed by Danisco. Consequently, our business has changed dramatically as compared to the past, as we no longer have any product revenue related to our enzyme business. We also now apply the C1-cell protein production platform in the biopharmaceutical market, which has higher risks and a higher barrier to entry.

As we attempt to adapt our microbial protein production platforms, including C1 and Dapibus™ and our other technologies for use in the biopharmaceutical and other markets, our business is subject to the execution, integration, and research and development risks that early-stage companies customarily face with new technologies, products and markets. These risks relate to, among other things, our ability to successfully further develop our protein production platforms and our other technologies, products and processes, assemble and maintain adequate production and research and development ("R&D") capabilities, comply with regulatory requirements, construct effective channels of distribution and manage growth. We have encountered and will continue to encounter risks and difficulties frequently experienced by early-stage companies in expanding and upgrading our intellectual property, regulatory, marketing, sales and R&D capabilities, improving our accounting and financial reporting and internal controls infrastructure, and adapting to the rapidly evolving industries in which we operate. Additionally, we are subject to competition from much larger companies with more resources than we have. Also, the market for developing and manufacturing pharmaceutical proteins produced from a filamentous fungus, such as the C1 fungus, is a market that is not yet established and is subject to a high level of regulatory hurdles from the U.S. Food and Drug Administration (the "FDA") and other governmental bodies, and there is a risk that such technologies will not be adopted by the pharmaceutical industry or governmental agencies and therefore not succeed and/or not grow at the rates projected or at all.

We have not yet commercialized any products based on our platforms and technologies, and we may never be able to do so. We do not know when or if we and/or our current and/or future collaborators and licensees will complete any of our or their product development efforts, obtain regulatory approval for any product candidates incorporating our technologies or successfully commercialize any approved products. Even if we and/or our licensees and collaborators are successful in developing products that are approved for marketing, we and they will still require that these products gain regulatory approval and market acceptance. The biopharmaceutical industry is a high-risk industry in that even if we are successful at expressing certain proteins, these proteins may fail to be advanced or approved for use or sale for many reasons including their characteristics, biological activity, biological comparability, biological similarity, stability, glycosylation structures, containments, purity, performance, safety and regulatory reasons.

Because of the numerous risks and uncertainties associated with pharmaceutical product development, we are unable to predict the timing or amount of increased expenses or when, or if, we will be able to achieve certain technology, product and/or commercial milestones, access fees and royalties, launch products and/or processes, or achieve profitability. In addition, our expenses could increase if we are required by the FDA or other domestic and foreign regulatory authorities to perform studies or trials in addition to those currently expected, or if there are delays in completing additional safety studies such as toxicology and pathogenicity studies, clinical trials, preclinical studies, animal or human studies or the development of any of our or our collaborators' product candidates.

We have a history of net losses, and we may not achieve or maintain profitability.

As of December 31, 2023, we had an accumulated deficit of approximately $80.3 million. Our profitability has strongly relied on, and will be even more reliant going forward on, third party industry and government research funding, licensing partnerships and other forms of collaborations. We believe that it is likely that if we do not sign license agreements or other forms of collaborations, we will incur losses because of our planned levels of R&D and additional general and administrative expenditures that we believe are necessary to operate our business and further develop our microbial protein production platforms and other technologies for use in the pharmaceutical and non-pharmaceutical industries. The amount of our future net losses will depend, in part, on the rate of increase in our expenses along with other potential cost of unforeseen circumstances, our ability to generate research funding, government grants, receipt of access fees, milestones, royalty and other payments, and whether we are able to generate revenues by entering into license agreements or other forms of collaborations, launch new products and/or processes from future licensees or collaborators, and our ability to raise additional capital. The net losses we anticipate incurring over the next several years will have an adverse effect on our stockholders' equity and working capital.

The R&D efforts needed to enhance and leverage our microbial protein production platforms, including C1 and Dapibus™, for use in developing and manufacturing human and animal biopharmaceuticals and other non-pharmaceutical products will require significant funding and increased staffing. Therefore, we expect near-term operating and research expenses to continue, and maybe even accelerate, as we further develop our research and business plans, and our goals and objectives. Consequently, we will require significant additional revenue to achieve profitability. We cannot provide assurance that we will be able to generate any revenues from our focus and efforts as we intend to apply our C1-cell and Dapibus™ into the biopharmaceutical and non-pharmaceutical industries. If we fail to enter into new license agreements or other forms of collaborations or generate revenues and profit from additional research projects and government grants, the market price of our common stock will likely decrease. Further regulatory complications, competition from other technologies, or delays in our research programs and the adoption and use of the C1-cell and Dapibus™ protein production platforms and our other technologies by the biopharmaceutical and non-pharmaceutical industries may force us to reduce our staffing and research and development efforts, which may further affect our ability to generate cash flow.

We could fail to manage our growth.

We will need to take the following steps, among others, to manage our growth. If we fail to achieve one or more of these, it could have a material adverse effect on our business, financial condition and results of operations.

- Balance our cash burn with technology and product development;
- Maintain and add additional CROs (Contract Research Organizations), other third-party service providers or other technology collaborators;
- Maintain and add additional collaborators, strategic partners technology licensees or other forms of structures;
- Recruit, hire and maintain the required employees necessary to maintain and grow our business and to advance our technologies and products;
- Achieve technical and commercial success in our research and product development programs;
- Access required manufacturing capacity;
- Access additional capital;
- Recruit and maintain consultants, board members and scientific advisory board members; and
- Manage scientific risks and uncertainties that may arise during our R&D and regulatory programs.

Our revenue growth depends in part on market and regulatory acceptance of our microbial protein production platforms and other technologies to develop and manufacture animal and/or human biopharmaceutical and non-pharmaceutical products.

The success of our biopharmaceutical business will depend on our ability to develop, register, and introduce similar, new and improved technologies and products in a timely manner, at significantly lower manufacturing costs that address the evolving requirements of the pharmaceutical industry and potential customers. There is no assurance that the C1-cell protein production platform or any product expressed from C1, or our other technologies, will perform the same or better, save our customers money relative to existing gene expression technologies or those of our competitors, provide our customers with other benefits, obtain governmental safety and regulatory approvals, be registered or gain market acceptance. If we fail to develop similar, new and better performing technologies, products and processes at significantly lower manufacturing costs, make fermentation yield improvements on our existing production processes, generate the necessary safety and regulatory data or gain registration and market acceptance of the C1-cell and Dapibus™ protein production platforms, or our other technologies, products or processes, we could fail to recoup our R&D investments and fail to capitalize on potential opportunities or gain market share from our competitors. Any failure, for technological, quality, safety, regulatory, or other reasons, to develop and launch improved technologies and new products, could negatively impact our business, financial condition and results of operation.

The dynamic and conservative nature of the biopharmaceutical industry, the unpredictable nature of the product development process and the time and cost of new technology adoption in the biopharmaceutical industry may affect our ability to meet the requirements of the marketplace or achieve market and/or regulatory acceptance.

The expenses or losses associated with unsuccessful technology and product development activities or lack of market acceptance of our new technologies and products could harm our business, financial condition and results of operations.

We may fail to commercialize our microbial protein production platforms or other technologies for the expression of therapeutic proteins, antibodies, vaccines, and metabolites or other non-pharmaceutical biologic products.

We have not yet completed the necessary safety, efficacy, cost and regulatory studies, or the commercialization of any therapeutic proteins, antibodies and vaccines, and metabolites or other non-pharmaceutical biologic products based on C1 or Dapibus™.

To date, drug companies have developed and commercialized only a small number of gene-based products in comparison to the total number of drug molecules available in the marketplace. Our biopharmaceutical business should be evaluated as having the same risks as those inherent to early-stage biotechnology companies because the application of the C1-cell protein production platform for the expression of pre-clinical and clinical quantities of therapeutic proteins, antibodies and vaccines is still in early development.

Successful development of our microbial protein production platforms, including C1 and Dapibus™, for biopharmaceutical and non-pharmaceutical purposes will require significant research, development and capital investment, including testing, to prove its safety, efficacy and cost-effectiveness. In general, our experience has been that each step in the process has been longer and costlier than originally projected, and we anticipate that this is likely to remain the case with respect to the continuing development efforts of our biopharmaceutical and non-pharmaceutical business.

If our competitors develop technologies and products more quickly and market more effectively than our product candidates, our commercial opportunity will be reduced or eliminated.

The biopharmaceutical industry is characterized by rapid technological change, and the area of gene and protein research and platform development is a rapidly evolving field. Any biopharmaceutical products we or our current collaborators or licensees develop through the C1-cell protein production platform, or through our other technologies, will compete in highly competitive and regulated markets. Many of the organizations competing with us in the market for such products have more capital resources, larger R&D and marketing staff, facilities and capabilities, and greater experience in research and development, regulatory approval, manufacturing and commercialization of technology and products. Accordingly, our competitors may be able to develop technologies and products more rapidly. Our future success will depend on our ability to maintain a competitive position with respect to technological advances in terms of product and process quality, stability, safety, productivity and cost. If a competitor develops superior technology or products, or more cost-effective alternatives to our and our collaborators' or licensees' technologies, products or processes, it could have a material adverse effect on our business, financial condition and results of operations. Well-known and highly competitive biotechnology companies offer comparable or alternative technologies for the same products and services as our biopharmaceutical and non-pharmaceutical business. We anticipate that we and our current or future collaborators and licensees will continue to encounter increased competition as new companies enter these markets and as the development of biological processes and products evolves.

Alternative technologies may not require microbial or other cell produced proteins, such as our proprietary C1 cells.

Research is being conducted with cell or gene-based therapies and other technologies that offer a possible alternative to producing proteins as they are being produced today based on microbial, organic matter containing Carbon, Hydrogen, and Oxygen or other organisms, such as our proprietary C1 cells or Dapibus™. Alternative methods may allow genes to be directly inserted into cells that can be implanted into animals and humans directly, displacing the need for the existing methods used for the development of biologic vaccines and drugs. If they are successful, these new methods may supplant or greatly reduce the need for microorganisms, Carbon, Hydrogen, and Oxygen or other organisms, including our C1 cells and Dapibus™, to produce these proteins externally as the injected cells in animals and humans may be able to do so internally.

Our SARS-CoV-2 vaccine candidates are at the clinical stage and have not been approved for sale. We have not developed, manufactured or commercialized any vaccine product in the past, and we may be unable to produce a vaccine that can be used to successfully prevent the SARS-CoV-2 virus or its variants of concern, in a timely and economical manner, if at all.

Our DYAI-100, SARS-CoV-2 vaccine candidate has successfully completed its Phase 1 clinical trial in South Africa. However, we do not plan to continue Phase 2/3 clinical trials of DYAI-100 unless we obtain funding from our partners and collaborators. Moreover, adverse events, or the perception of adverse events, relating to vaccine product candidates and delivery technologies may negatively impact our ability to develop commercially successful products and also may lead to greater government regulation, which could have a material effect on our ability to develop and market our SARS-CoV-2 vaccine product candidates.

The success of our efforts to develop and commercialize our vaccine product candidates could fail for a number of reasons. Accordingly, we may be unable to produce a vaccine that successfully targets SARS-CoV-2 in a timely and economical manner, if at all. For example, we expect to commit significant financial resources and personnel to the development of SARS-CoV-2 vaccine product candidates, which may cause delays in or otherwise negatively impact our other product candidate development program. The outcome of any research and development program is highly uncertain. Only a small fraction of biotechnology and vaccine development programs ultimately result in commercial products or even product candidates, and a number of events could delay our development efforts and negatively impact our ability to obtain regulatory approval for, and to manufacture, market and sell, a vaccine. Additionally, our ability to develop an effective vaccine will depend on our ability to work on an accelerated timeline, with limited access to financial resources beyond those that we currently possess, and in competition with a significant number of better-funded and more experienced vaccine-development companies. Moreover, uncertainties exist surrounding the longevity and severity of COVID-19 as a global health concern, and given the COVID-19 pandemic is now relatively contained and the risk of further spread is diminished, we may be unable to identify strategic partners willing to work with and support us in our development efforts and/or the market that we anticipate for this product candidate may not exist or may be much smaller than we previously anticipated. Alternatively, even if a market exists, our vaccine product candidates could be found to be ineffective or unsafe, or otherwise fail to receive necessary regulatory clearances. Our vaccine product candidates, even if safe and effective, could be difficult to manufacture on a large scale or uneconomical to market, or our competitors could develop superior products more quickly and efficiently or more effectively market their competing products. Accordingly, our inability to develop a commercially successful vaccine product could materially harm our business.

The results of nonclinical studies and early-stage clinical trials may not be predictive of future results.

The results of nonclinical studies may not be predictive of the results of clinical trials, and the results of any early-stage clinical trials we commence may not be predictive of the results of the later-stage clinical trials. Vaccine and drug candidates in later stages of clinical trials may fail to show the desired safety and efficacy despite having progressed through nonclinical studies and initial clinical trials. There is a high failure rate for drugs proceeding through clinical trials, and a number of companies in the pharmaceutical and biotechnology industries have suffered significant setbacks in clinical development even after achieving promising results in earlier studies. There can be no assurance that any of our current or future clinical trials will ultimately be successful or support further clinical development of any of our vaccine and drug candidates. Even if our clinical trials are completed, the results may not be sufficient to obtain regulatory approval of any products. Any such setbacks in our clinical development could have a material adverse effect on our business and operating results.

We may need substantial additional capital in the future to fund our business.

Our future capital requirements may be substantial, particularly as we continue to further develop, engineer and optimize our microbial protein production platforms and other proprietary technologies, products and processes for licensing for research and development, and commercialization of potential animal and human pharmaceutical products.

We currently have very little leverage, and if our capital resources are insufficient to meet our capital requirements, we will have to raise additional funds to continue the development of our technologies and complete the development and commercialization of products, if any, resulting from our technologies. If the acquisition of additional funds is not possible or if we engage in future equity financings, dilution to our existing stockholders may result. If we raise capital through debt financing, we may be subject to restrictive covenants that limit our ability to conduct our business. We may not be able to raise funds on terms that are favorable to us, if at all. If we fail to raise sufficient funds and incur losses, our ability to fund our operations, take advantage of strategic opportunities, develop products or technologies, or otherwise respond to competitive pressures could be significantly limited. If this happens, we may be forced to delay or terminate research or development programs or the commercialization of products resulting from our technologies, curtail or cease operations or obtain funds through collaborative and licensing arrangements that may require us to relinquish commercial rights, sell certain assets of the company which will limit future opportunities, or grant licenses on terms that are not favorable to us. Without sufficient funding or revenue, we may have to curtail, cease, or dispose of one or more of our operations, which would have a material adverse effect on our business, financial condition, and future prospects.

Changes in global economic and financial markets may have a negative effect on our business.

Our business is subject to a variety of market forces including, but not limited to, domestic and international economic, political and social conditions. Many of these forces are beyond our control. Any change in market conditions that negatively impacts our operations or the demand of our current or prospective customers could adversely affect our business operations. For example, economic uncertainty and volatility, including as a result of high-interest rates and inflation, have had and may continue to have a material adverse effect on our business.

Changes in the global financial, pharmaceutical and biotech markets may make it difficult to accurately forecast operating results. These changes have had, and may continue to have, a negative effect on our business, results of operations, financial condition and liquidity. In the event of a downturn in global economic activity, current or potential business partners may go out of business, may be unable to fund purchases or determine to reduce purchases, all of which could lead to reduced demand for our products and increased payment delays or defaults. We are also limited in our ability to reduce costs to offset the results of a prolonged or severe economic downturn given certain fixed costs associated with our operations and difficulties if we over strained our resources. The timing and nature of a sustained recovery in the credit and financial markets remain uncertain, and there can be no assurance that market conditions will significantly improve in the near future or that our results will not continue to be materially and adversely affected.

In addition, geopolitical risks, including those arising from political turmoil, trade tension or the imposition of trade tariffs and/or sanctions, terrorist activity and acts of civil or international hostility, are increasing. For instance, the ongoing military conflict between Russia and Ukraine, as well as conflicts in the Middle East have had negative impacts on the global economy and is expected to have further global economic consequences. Any such events and responses, including regulatory developments, may cause significant volatility and declines in the global markets, disproportionate impacts to certain industries or sectors, disruptions to commerce (including to economic activity, travel and supply chains), loss of life and property damage, and may materially and adversely affect the global economy or capital markets, as well as our business and results of operations. Should an economic slowdown occur in the U.S. or globally, our business and results of operations may be materially adversely affected.

We face risks related to widespread outbreaks of contagious disease or other biological threats, any of which could significantly disrupt our operations and have a material adverse effect on our business, employees, directors, consultants, collaborators and other third parties, including business development activities and research and development projects conducted by third party contract research organizations parties.

Significant outbreaks of contagious diseases, and other adverse public health developments, have had and could have a material impact on our business operations, financial condition, and operating results. Pandemics and other outbreaks of contagious disease have in the past and could in the future significantly impact the operation of our business. For example, pandemics have in the past adversely affected our ability to carry on certain business development activities, including as a result of restrictions in business-related travel, delays or disruptions in our on-going research projects, and unavailability of the employees of the Company or third-party contract research organizations with whom we conduct business, due to illness or quarantines. In addition, pandemics and other outbreaks of contagious disease have in the past and may in the future exacerbate other risks disclosed in this Annual Report. See, for example, "*—Changes in global economic and financial markets may have a negative effect on our business.*" Whether and to what extent future pandemics and other outbreaks of contagious diseases may impact our financial and operational performance will depend on developments that include the duration, spread and severity of the outbreak, the timetable for administering and efficacy of vaccines, the duration and geographic scope of related travel advisories and restrictions and the extent of the impact of the pandemic or outbreak on overall demand for our products, technologies and services, and other factors beyond our control, all of which are highly uncertain and cannot be predicted.

Our sales and operations are subject to the risks of doing business internationally.

Our sales and operations are subject to the risks of doing business internationally, as we have customers and partners located outside of the United States. Conducting business internationally exposes us to a variety of risks, including:

- changes in or interpretations of foreign regulations that may adversely affect our ability to sell our products, repatriate profits to the United States or operate our foreign-located facilities;
- the imposition of tariffs;
- the imposition of limitations on, or increase of, withholding and other taxes on remittances and other payments by foreign subsidiaries or joint ventures;
- uncertainties relating to foreign laws, regulations and legal proceedings including tax, import/export, anti-corruption and exchange control laws;
- the availability of government subsidies or other incentives that benefit competitors in their local markets that are not available to us;
- increased demands on our limited resources created by our operations may constrain the capabilities of our administrative and operational resources and restrict our ability to attract, train, manage and retain qualified management, technicians, scientists and other personnel;
- economic or political instability in foreign countries;
- difficulties associated with staffing and managing foreign operations; and
- the need to comply with a variety of United States and foreign laws applicable to the conduct of international business, including import and export control laws and anti-corruption laws.

If we lose key personnel, including key management or board members, or are unable to attract and retain additional personnel, it could delay our technology and product development programs and harm our R&D efforts, and we may be unable to pursue research funding, licenses and other forms of collaborations or develop our own products.

Our planned activities will require retention, and ongoing recruiting of additional expertise in specific areas applicable to our industries, technologies and products being developed. These activities will not only require the development of additional expertise by existing management personnel, but also the addition of new research and scientific, regulatory, licensing, sales, marketing, management, accounting and finance and other personnel. The inability to acquire or develop this expertise or the loss of principal members of our management, board of directors, consultants, accounting and finance, sales, and scientific staff could impair the growth, if any, of our business. Competition for experienced personnel from numerous companies, academic institutions and other research facilities may limit our ability to attract and retain qualified management, directors, consultants, and scientific personnel on acceptable terms. Failure to attract and retain qualified personnel would inhibit our ability to maintain and pursue collaborations and develop our products and core technologies.

Personnel changes may disrupt our operations. Hiring and training new personnel will entail costs and may divert our resources and attention from revenue-generating efforts. In addition, we periodically engage consultants to assist us in our business and operations. These consultants operate as independent contractors, and we therefore do not have as much control over their activities as we do over the activities of our employees. Our directors and consultants may be affiliated with or employed by other parties, and some may have consulting or other advisory arrangements with other entities that may conflict or compete with their obligations to us.

We may be sued for product liability.

We or our current and future collaborators and licenses may be held liable if any product we or they develop, or any product which is made with the use or incorporation of, any of our technologies, causes injury or is found otherwise unsuitable or unsafe during product testing, manufacturing, marketing or sale. These claims could be brought by various parties, including other companies who purchase products from our current and future collaborators and licenses or by end users of the products.

While we maintain product liability insurance, it may not fully cover all of our potential liabilities and our liability could in some cases exceed our total assets, which would have a material adverse effect on our business, results of operations, financial condition and cash flows, or cause us to go out of business. Further, insurance coverage is expensive and may be difficult to obtain and may not be available to us or to our collaborators and licensees in the future on acceptable terms, or at all. Inability to obtain sufficient insurance coverage at an acceptable cost to protect against potential product liability claims could prevent or inhibit the commercialization of products developed by us, or our collaborators and licensees.

Foreign currency fluctuations could adversely affect our results.

In the conduct of our business, in certain instances, we are required to receive payments or pay our obligations in currencies other than U.S. dollars. Especially since a large portion of our research and development is done in Europe, our CROs and certain consultants request payments in Euros. As a result, we are exposed to changes in currency exchange rates with respect to our business transactions denominated in non-US dollars. Fluctuations in currency exchange rates have in the past and may in the future negatively affect our revenue, expenses and our financial position and results of operations as expressed in U.S. dollars.

Our ability to use our net operating loss carryforwards ("NOLs") to offset future taxable income may be subject to certain limitations.

In general, under Section 382 of the Internal Revenue Code, a corporation that undergoes an "ownership change" is subject to limitations on its ability to utilize its NOLs, to offset future taxable income. If the Internal Revenue Service challenges our analysis that our existing NOLs are not subject to limitations arising from previous ownership changes, our ability to utilize NOLs could be limited by Section 382 of the Internal Revenue Code. Future changes in our stock ownership, some of which are outside of our control, could result in an ownership change under Section 382 of the Internal Revenue Code. Furthermore, our ability to utilize NOLs of companies that we may acquire in the future may be subject to limitations.

We may make acquisitions, investments and strategic alliances that may use significant resources, result in disruptions to our business or distractions of our management, may not proceed as planned, and could expose us to unforeseen liabilities.

We may seek to expand our business through the acquisition of, investment in and strategic alliances with companies, technologies, products, and services. If we are able to identify suitable acquisition, investment or strategic alliance targets, we may be unable to successfully negotiate their acquisition at a price or on terms and conditions acceptable to us.

We cannot assure you that, following an acquisition, investment or strategic alliance, we will achieve expected research and development results, anticipated synergies, revenues, specific net income or loss levels that justify such transaction or that the transaction will result in increased earnings, or reduced losses, for the combined company in any future period. Moreover, we may need to raise additional funds through public or private debt or equity financing to acquire any businesses or to provide funding for such business, which would result in dilution for stockholders or the incurrence of indebtedness and may not be available on terms which would otherwise be acceptable to us. We may not be able to oversee such investments nor operate acquired businesses profitably or otherwise implement our growth strategy successfully.

We rely significantly on information technology and any failure, inadequacy, interruption or security lapse of that technology, including any cybersecurity incidents, could harm our ability to operate our business effectively.

Despite the implementation of security measures, our internal computer systems and those of third parties with which we contract are vulnerable to damage from cyber-attacks, computer viruses, unauthorized access, natural disasters, terrorism, war, and telecommunication and electrical failures. System failures, accidents, or security breaches could cause interruptions in our operations and could result in a material disruption of our research activities and business operations, in addition to possibly requiring substantial expenditures of resources to remedy. While we have experienced and continue to experience system failures, accidents and security breaches from time to time, none has been material to date. To the extent that any disruption or security breach was to result in a loss of, or damage to, our data or applications, or inappropriate disclosure of confidential or proprietary information, we could incur liability and delays in our research efforts and financial reporting compliance, as well as a significant increase in costs to recover or reproduce the data.

Of special note is our risk when implementing new capabilities. The implementation of new systems and information technology could adversely impact our operations by requiring substantial capital expenditures, diverting management's attention, or causing delays or difficulties in transitioning to new systems. As we implement new systems, many times both new and old systems run in parallel until all processes have successfully transferred to the new system and thorough testing has been performed. These events could impact our customers, suppliers, subcontractors, employees, our financial reporting and our reputation and lead to financial losses from remediation actions, loss of business or potential liability, or an increase in expense, all of which may have a material adverse effect on our business. Our systems implementations may also not result in productivity improvements at the levels anticipated. In addition, the rapid evolution and increased adoption of artificial intelligence technologies may intensify our cybersecurity risks. Likewise, cyber incidents, including malicious cyber-attacks perpetrated on our employees and cyber incidents caused by third parties surreptitiously accessing our systems by other means, are an on-going risk to the security of the systems, networks, information and data of ours, our customers, subcontractors and suppliers. While we have security, internal control and technology measures in place to protect our systems and networks, confidential business information, personal data of ours, our customers, employees, suppliers and subcontractors, our information technology systems and those of our third-party service providers have been and may in the future be subject to system breaches. System breaches can lead to disclosure, modification and destruction of proprietary business data, personally identifiable information, other sensitive information, production downtime or loss of business, and damage to our reputation, competitiveness and operations. In addition, flexible working arrangements and remote working for overseas consultants may adversely impact our ability to maintain the security, proper function and availability of our information technology and systems since remote working by our employees and consultants could strain our technology resources and introduce operational risk, including heightened cybersecurity risk. Remote working environments may be less secure and more susceptible to hacking attacks, including phishing and social engineering attempts that have sought, and may seek, to exploit remote working environments. In addition, current and future laws and regulations governing data privacy and the unauthorized disclosure of confidential information, including, but not limited to rules implemented by the SEC in 2023, may pose complex compliance challenges and result in additional costs. A failure to comply with such laws and regulations could result in penalties or fines, legal liabilities or reputational harm. The continuing and evolving threat of cyber-attacks has also resulted in increased regulatory focus on risk management and prevention. New cyber-related regulations or other requirements could require significant additional resources and cause us to incur significant costs, which could have an adverse effect on our results of operations and cash flows.

Changes to our outsourced software or infrastructure vendors as well as any sudden loss, breach of security, disruption or unexpected data or vendor loss associated with our information technology systems could have a material adverse effect on our business.

We rely on third-party software and infrastructure to run critical accounting, project management and financial information systems. If software or infrastructure vendors decide to discontinue further development, integration or long-term maintenance support for our information systems, or there is any system interruption, delay, breach of security, loss of data or loss of a vendor, we may need to migrate some or all of our accounting, project management and financial information to other systems. These disruptions could increase our operational expense as well as impact the management of our business operations, which could have a material adverse effect on our financial position, results of operations, cash flows and liquidity.

Risks Related to Dependence on Third Parties

We are dependent on collaborations with third parties, and if we fail to maintain or successfully manage existing, or enter into new, strategic collaborations, we may not be able to develop and commercialize many of our technologies and products and achieve profitability.

Our R&D revenue is generated from a small number of research collaborations. These collaborations could be delayed or be discontinued, as they have in the past, at any time with little advance notice. If these research collaborations are lost or do not perform as expected, it could have a material adverse effect on our business, financial condition and operating results.

Our ability to enter into, maintain and manage collaborations in our target markets is fundamental to the success of our business. We currently rely on, and expect to continue to rely on, our current and future partners, in part, for research and development, manufacturing and distribution, sales and marketing services, and application and regulatory know how. In addition, we intend to enter into additional collaborations to conduct research, develop, produce, market, license and sell our technologies and products and processes we anticipate developing. However, we may not be successful in entering into collaborative arrangements with third parties. Any failure to enter into such arrangements on favorable terms could delay or hinder our ability to develop and commercialize our technologies, products and processes and could increase our costs of research and development and commercialization.

We have limited or no control over the resources that any collaborator or licensee may devote to our programs, and reductions in collaborators' R&D budgets may affect our businesses.

Any of our current or future collaborators or licensees may breach or terminate their agreements with us or otherwise fail to perform and conduct their required activities successfully and in a timely manner. Our collaborators or licensees may elect not to develop products arising out of our collaborative or license arrangements or may choose not to devote sufficient resources to the development, manufacture, market or sale of these products. If any of these events occur, we or our collaborators or licensees may not develop our technologies or commercialize our or their products.

Fluctuations in the R&D budgets of government agencies, our customers, licensees, collaborators and research partners could have a significant impact on the interest in and demand for our technology. Our businesses could be seriously damaged by significant decreases in life sciences and/or pharmaceutical R&D expenditures by government agencies and existing and potential partners.

We heavily rely on contracts with third-party contract research organizations ("CROs") and other third-party service providers to conduct our research and development, pre-clinical, CMC and cGMP manufacturing, fill and finish, and potential clinical trials, which may not be available to the Company on commercially reasonable terms or at all.

As a result of the DuPont Transaction, we no longer own a research and development laboratory and we became dependent upon the performance and research capacity of a number of third-party contract research organizations and other service providers to conduct our research and development projects, pre-clinical, CMC and cGMP manufacturing, fill and finish, and potential clinical trials, which include services and programs in connection with the modification and enhancement of the Company's C1-cell protein production platform and to support our business development efforts for C1's use in biopharmaceutical applications. The licensing and service arrangements with these third parties are not guaranteed to be obtained, renewed or continued on reasonable terms, if at all. The Company may be unable to obtain, maintain or expand its access to third party CROs and other service providers to conduct these services. Failure to obtain, maintain and expand access to certain third party CROs and other service providers could have a material adverse impact on the Company's research projects, financial condition and operating results. In addition, from time to time there are disagreements with such third parties that if not resolved can have a material adverse effect on our business, financial condition and operating results.

We are heavily dependent upon the availability and performance of third-party research organizations. If we require research capacity and/or capabilities and are unable to obtain it in sufficient quantity, and quality or at terms and conditions that are acceptable to the Company or our third party collaborators, we may not be able to offer our technologies or products for license, or sale, or we may be required to make substantial capital investments to build out that capacity or to contract with other research organizations on terms that may be less favorable than our current arrangements. In addition, if we contract with other research organizations, we may experience delays of several months in qualifying them or in starting up research programs at these facilities, which could harm our relationships with our licensees, collaborators or customers, and we may be required to make a capital investment in connection with these arrangements. This could have a material adverse effect on our business, revenues or operating results.

Additionally, if we were to be unsuccessful in retaining a CRO with the requisite experience and skills we require and were required to build our own research facility, it could take a year or longer before such owned research facility were able to be brought online to carry out the necessary technology and product development efforts of the Company.

Conflicts with the CROs, other service providers, collaborators and/or licensees could harm our business.

An important part of our strategy includes involvement in proprietary research programs. We may pursue opportunities in the pharmaceutical field that could conflict with those of our collaborators and licensees. Moreover, disagreements with Danisco, our current and/or future CROs, other service providers, collaborators or licensees could develop over rights to our intellectual property, over further licensing of our technologies to other parties in certain pharmaceutical fields, or for other reasons. Any conflict with Danisco, our current and/or future CROs, other service providers, collaborators or licensees could reduce our ability to obtain future collaboration agreements and negatively impact our relationship with existing collaborators or licensees, which could reduce our revenues and profits.

Some of our current and/or future CROs, other service providers, collaborators and/or licensees could also become competitors in the future. Our current and/or future CROs, other service providers, collaborators and/or licensees could develop competing technologies or products, preclude us from entering into collaborations or license agreements with their customers, fail to obtain timely regulatory approvals, terminate their agreements with us prematurely or fail to devote sufficient resources to the development and commercialization of their technology and products and processes. Any of these developments could harm our technology development and value, product development efforts, revenue, profits and overall business.

We rely on our collaborators and other third parties to deliver timely and accurate information in order to accurately report our financial results as required by law.

We need to receive timely, accurate and complete information from a number of third parties in order to accurately and timely report our financial results. We rely on third parties to provide us with complete and accurate information regarding research developments and data, revenues, expenses and payments owed to or by us on a timely basis. We rely on the proper controls and procedures related to obtaining and reporting information from our CROs, licensees and collaborators related to research results and other data, when milestones are earned, if any, when royalties are earned, if any, as well as other types of potential revenues and expenses. If the information that we receive is not accurate, our consolidated financial statements may be materially incorrect and may require restatement. As a result, we may have difficulty in completing accurate and timely financial disclosures, which could have a material adverse effect on our business, financial condition and results of operations and the market price of our common stock.

Risks Related to Government Regulations and Environmental, Social, and Governance Issues

Potential future regulations limiting our ability to sell genetically engineered products could harm our business.

We, our current and future collaborators and licensees expect to develop biologic products using genetically engineered microorganisms ("GMOs"). Products derived from GMOs may in some instances be subject to bans or additional regulation by federal, state, local and foreign government agencies. These agencies may not allow us or our collaborators and licensees to produce and market products derived from GMOs in a timely manner or under technically or commercially feasible conditions.

Compliance with FDA, Environmental Protection Agency ("EPA") and EU regulations could result in expenses, delays or other impediments to our product development programs or the commercialization of resulting products. The FDA currently applies the same regulatory standards to products made through genetic engineering as those applied to products developed through traditional methodologies. Regardless of GMO status, a product may be subject to lengthy FDA reviews and unfavorable FDA determinations due to safety concerns or changes in the FDA's regulatory policy. The EPA regulates biologically derived enzyme-related chemical substances not within the FDA's jurisdiction. An unfavorable EPA ruling could delay commercialization or require modification of the production process or product in question, resulting in higher manufacturing costs, thereby making the product uneconomical. The EU and other countries also have regulations regarding the development, production and marketing of products from GMOs, which may be as or more restrictive than U.S. regulations.

Further, we, Danisco, and our current and future collaborators and licensees are subject to regulations in the other countries in which we operate outside of the U.S. and EU, which may have different rules and regulations depending on the jurisdiction. Different countries have different rules regarding which products qualify as GMOs. If any of these countries expand the definition of GMO and increase the regulatory burden on GMO products, our business could be harmed.

Other changes in regulatory requirements, laws and policies, or evolving interpretations of existing regulatory requirements, laws and policies, may result in increased compliance costs, delays, capital expenditures and other financial obligations that could adversely affect our business or financial results.

Public views on ethical and social issues may limit use of our technologies.

Our success will depend in part upon our ability, and our current and future collaborators' or licensees' ability, to develop pharmaceutical and non-pharmaceutical products discovered, developed and manufactured through the C1-cell protein production platform, and our other technologies. Governmental authorities could, for social, ethical or other purposes, limit the use of genetic processes or prohibit the practice of using a modified C1 organism to produce biologic vaccines, drugs and other biologic products. Concerns about the C1-cell protein production platform and our other technologies, and particularly about the expression of genes from C1 for pharmaceutical purposes, could adversely affect their market acceptance.

The commercial success of our current and future collaborations and our licensees' potential products will depend in part on public acceptance of the use of genetically engineered products including enzymes, vaccines, drugs and other protein products produced in this manner. Claims that genetically engineered products are unsafe for consumption or pose a danger to the environment, animals or humans may influence public attitudes. Our and our licensees' genetically engineered products may not gain public acceptance. Negative public reaction to GMOs and products could result in increased government regulation of genetic research and resulting products, including stricter labeling laws or other regulations, and could cause a decrease in the demand for our products. If we and/or our collaborators are not able to overcome the ethical, legal, and social concerns relating to genetic engineering, some or all of our products and processes may not gain public acceptance, which could have a material adverse effect on our business, financial condition and results of operations.

Our results of operations may be adversely affected by environmental, health and safety laws, regulations and liabilities.

We and the CROs, collaborators and licensees are subject to various federal, state and local environmental laws and regulations relating to the discharge of materials into the air, water and ground, the generation, storage, handling, use, transportation and disposal of hazardous materials, and the health and safety of our employees. These laws, regulations and permits can often require expensive pollution control equipment or operational changes to limit actual or potential impacts to the environment. A violation of these laws and regulations or permit conditions could result in substantial fines, criminal sanctions, permit revocations and/or facility shutdowns.

In addition, new laws, new interpretations of existing laws, increased government enforcement of environmental laws, or other developments could require us or our CROs or other service providers to make additional significant expenditures. Present and future environmental laws and regulations and interpretations thereof, more vigorous enforcement of policies and discovery of currently unknown conditions may require substantial expenditures that could have a material adverse effect on our results of operations and financial position. Additionally, any such developments may have a negative impact on our contract manufacturers, which could harm our business.

Increasing scrutiny and changing expectations from customers, regulators, investors, and other stakeholders with respect to our environmental, social and governance practices may impose additional costs on us or expose us to new or additional risks.

Companies are facing increasing scrutiny from customers, regulators, investors, and other stakeholders related to their environmental, social and governance practices. Investor advocacy groups, investment funds and influential investors are also increasingly focused on these practices, especially as they relate to the environment, health and safety, supply chain management, diversity and human rights. Failure to adapt to or comply with regulatory requirements or investor or stakeholder expectations and standards could negatively impact our reputation and the price of our common stock.

In addition, our customers may adopt policies that include social and environmental requirements or may seek to include such provisions in their contract terms and conditions. These social and environmental responsibility provisions and initiatives are subject to change and vary from jurisdiction to jurisdiction, and certain elements may be difficult and/or cost prohibitive for us to comply with given the inherent complexity and the global scope of our operations. In certain circumstances, in order to meet the requirements or standards of our customers, we may be obligated to modify our sourcing practices or make other operational choices which may require additional investments and increase our costs or result in inefficiencies.

Any of the factors mentioned above, or the perception that we or those with whom we conduct business have not responded appropriately to the growing concern for such issues, regardless of whether we are legally required to do so, may damage our reputation and have a material adverse effect on our business, financial condition, results of operations cash flows and/or the price of our common stock.

We have no experience submitting applications to the FDA or similar regulatory authorities in the past and could be subject to lengthy and/or unfavorable regulatory proceedings.

While we understand that many of our current and future collaborators or licensees may have a proven track record of experience submitting application to the FDA or other applicable regulatory authorities, we have no such experience in the past. Neither we nor any collaborator or licensee has yet submitted any application with the FDA or any other regulatory authority for any product candidate generated through the use of the C1-cell protein production platform as it relates to the development and manufacture of pharmaceutical products. The FDA may not have substantial experience with technology similar to ours, which could result in delays or regulatory action against us. We and our current and future collaborators and licensees may not be able to able to obtain regulatory approval for C1 expressed products, which would harm our business.

The C1-cell protein production platform has been tested for use in the manufacturing of an enzyme in the production of wine, beer and fruit juices, and has generated promising safety and toxicity data for that enzyme. The C1-cell protein production platform could produce vaccines, antibodies, or therapeutic products and enzymes that have safety, toxicity, pathogenicity, immunogenicity and other issues associated with them. The C1-cell protein production platform and our other technologies may be subject to lengthy regulatory reviews and unfavorable regulatory determinations if they raise safety questions which cannot be satisfactorily answered or if results from studies do not meet regulatory requirements. An unfavorable regulatory ruling could be difficult to resolve and could delay or possibly prevent a product from being commercialized, or even delay or prevent the use of the C1-cell protein production platform or our other technologies to produce future products, which would have a material adverse effect on our growth and prospects. Additionally, future products produced by us or our current and future collaborators or licensees using the C1-cell protein production platform, or our other technologies may not be approved by the FDA or other regulatory agencies in the U.S. or worldwide. There is no assurance that safety, toxicity, pathogenicity, immunogenicity and other issues will not arise in current or future product development and manufacturing programs due to media, fermentation, inherent properties or genetic changes in the C1 and other strains and fermentation processes.

If these therapeutic protein products, antibodies or vaccines or other non-pharmaceutical products are not approved by regulators, we or our current and future customers or collaborators and licensees will not be able to commercialize them, and we may not receive research funding, upfront license fees, milestone and royalty payments, which are based upon the successful advancement of these products through the drug development and approval process. Even after investing significant time and expense, any regulatory approval may also impose limitations on the uses for which we can market a product, and any marketed product and its manufacturer are subject to continual review. Discovery of previously unknown problems with a product or manufacturer may result in new restrictions on the product, manufacturer and manufacturing facility, including withdrawal of the product from the market. In certain countries, regulatory agencies also set or approve prices, which may result in low or unprofitable margins and would have a material adverse effect on our business, financial condition and results of operations.

Risks Relating to Intellectual Property

Failure to protect our intellectual property and the intellectual property of certain third parties could harm our competitive position.

Our success will depend in part on our ability to obtain patents and on our and Danisco's (as part of the DuPont Transaction, patents were assigned to Danisco) and our current and future collaborators' and licensees' ability to maintain adequate protection of our and their intellectual property. If we, Danisco, or our current and future collaborators and licensees do not adequately protect our intellectual property, competitors may be able to practice our technologies and erode our competitive advantage. The laws of some foreign countries do not protect proprietary rights to the same extent as the laws of the United States, and many companies have encountered significant problems in protecting their proprietary rights in these foreign countries.

However, the patent positions of biotechnology companies, including our patent position, are generally uncertain and involve complex legal and factual questions. We will be able to protect our proprietary rights from unauthorized use by third parties only to the extent that our, and in certain instances the C1 patents assigned to Danisco, and our current and future collaborators' and licensees' proprietary technologies, are covered by valid and enforceable patents or are effectively maintained as trade secrets. We intend, from time to time, to apply for patents covering both our technologies and our products, while at other times, we only maintain such knowledge as trade secrets without applying for patents, as we deem appropriate. However, existing and future patent applications may be challenged and are not guaranteed to result in the issuing of patents. Even if a patent is obtained, it may not be sufficiently broad to prevent others from practicing our technologies or from developing competing products. Others, including Danisco and our current and future collaborators and licensees, may independently develop similar or alternative technologies or design around our, Danisco's or our current and future collaborators' and licensees' patented technologies. In addition, Danisco, our current and future collaborators, licensees, or other third parties may challenge or invalidate our patents, or our patents may fail to provide us with any competitive advantages. If any third party is able to gain intellectual property protections for technology similar to our own, they may be successful in blocking us and our licensees from using the C1-cell protein production platform or our other technologies and/or commercializing products derived from them.

We cannot ensure that any of our pending patent applications will result in issued patents, or even if issued, predict the breadth of the claims upheld in our and other companies' patents. Given that the degree of future protection for our proprietary rights is uncertain, we cannot ensure that we were the first to invent the inventions covered by our pending patent applications, or that we were the first to file patent applications for these inventions or the patents we have obtained.

In addition, Dyadic will continue to review its existing and potential patent positions and rights. Based on our analysis if and when the commercial opportunities and patent enforceability are questionable, we may abandon certain patents in some countries. There is a risk that we will abandon potentially valuable patents.

Litigation or other proceedings or third-party claims of intellectual property infringement could require us to spend significant time and resources and could prevent us and our collaborators from commercializing our or their technologies and products or negatively impact our stock price.

Our commercial success depends in part on neither infringing patents and proprietary rights of third parties, nor breaching any licenses that we have entered into with regard to our technologies and products. Others have filed, and in the future are likely to file, patent applications covering genes or gene fragments, genetic elements, screening, gene expression and fermentation processes and other intellectual property that we may wish to utilize with the C1-cell protein production platform or our other technologies or products and systems that are similar to those developed with its use. If these patent applications result in issued patents and we wish to use the claimed technology, we may need to obtain a license from the appropriate third party.

Third parties do and may continue to assert that we and/or our current and future collaborators and licensees are employing their proprietary technology without authorization. In addition, third parties may obtain patents in the future and claim that use of our technologies infringes these patents. We could incur substantial costs and diversion of management and technical personnel in defending ourselves against any of these claims or enforcing our patents and other intellectual property rights. Parties making claims against us may be able to obtain injunctive or other equitable relief, which could effectively block our ability to further develop, commercialize and sell products, and could result in the award of substantial damages against us. If a claim of infringement against us is successful, we may be required to pay damages and obtain one or more licenses from third parties. In the event that we are unable to obtain these licenses at a reasonable cost, we and/or current and future collaborators and licensees could encounter delays in product commercialization while we attempt to develop alternative methods or products. Defense of any lawsuit or failure to obtain any of these licenses could prevent us from commercializing available products.

In addition, unauthorized parties may attempt to steal, copy or otherwise obtain and use our C1 microbial strains, genetic elements, development and manufacturing processes, other technology or products. Monitoring unauthorized use of our intellectual property is difficult, and we cannot be certain that the steps we have taken will prevent unauthorized use of our technologies, particularly in certain foreign countries where the local laws may not protect our proprietary rights as fully as in the United States. Moreover, third parties could practice our inventions in territories where we do not have patent protection. Such third parties may then try to import into the United States or other territories products, or information leading to potentially competing products, made using our inventions in countries where we do not have patent protection for those inventions. If competitors are able to use our technologies, our ability and our current and future collaborators' and licensees' ability to compete effectively could be harmed. Moreover, others may independently develop and obtain patents for technologies that are similar to or superior to our technologies. If that happens, we may need to license these technologies, and we may not be able to obtain licenses on reasonable terms, if at all, which could harm our business, financial condition and results of operations.

Confidentiality agreements with employees and others may not adequately prevent disclosures of trade secrets and other proprietary information.

We rely in part on trade secret protection to protect our confidential and proprietary information and processes. However, trade secrets are difficult to protect. We have taken measures to protect our trade secrets and proprietary information, but these measures may not be effective. We require employees and consultants to execute confidentiality agreements upon the commencement of an employment or consulting arrangement with us. These agreements generally require that all confidential information developed by the individual or made known to the individual by us during the course of the individual's relationship with us be kept confidential and not disclosed to third parties. These agreements also generally provide that inventions conceived by the individual in the course of rendering services to us shall be our exclusive property. Nevertheless, our proprietary information may be disclosed, third parties could reverse engineer our biocatalysts and others may independently develop substantially equivalent proprietary information and techniques or otherwise gain access to our trade secrets. Costly and time-consuming litigation could be necessary to enforce and determine the scope of our proprietary rights, and failure to obtain or maintain trade secret protection could adversely affect our competitive business position.

Risks Related to Our Common Stock

The price of our shares of common stock is likely to be volatile, and you could lose all or part of your investment.

The trading price of our common stock has been, and is likely to continue to be, volatile. Biotechnology company stocks generally tend to experience extreme price fluctuations. The valuations of many biotechnology companies without consistent product sales and earnings are extraordinarily high based on conventional valuation standards such as price-to-earnings and price-to-sales ratios. These trading prices and valuations may not be sustained. Factors that may result in fluctuations in our stock price include, but are not limited to, the following:

- Changes in the public's perception of the prospects of biotechnology companies;
- Sales of our common stock in the public market by such stockholders or other significant stockholders, executive officers, or directors;
- Announcements of new technological innovations, patents or new products or processes by us, Danisco or our current or future collaborators, licensees and competitors;
- Announcements by us, Danisco or our collaborators and licensees relating to our relationships with third parties;
- Coverage of, or changes in financial estimates by us or securities and industry analysts;
- Conditions or trends in the biotechnology industry;
- Changes in investor interest in the areas in which we and/or our collaborators and licensees are applying our technologies, such as COVID-19;
- Changes in the market valuations of other biotechnology companies;
- Limitations or expanded uses in the areas within the biopharmaceutical or other industries into which we can apply our technologies and products;
- Actual or anticipated changes in our growth rate relative to our competitors;
- Developments in domestic and international governmental policy or regulations;
- Announcements by us, Danisco, our current and future collaborators and licensees, or our competitors of significant acquisitions, divestures, strategic partnerships, license agreements, joint ventures or capital commitments;
- The position of our cash, cash equivalents and marketable securities;
- Any changes in our debt position;
- Developments in patent or other proprietary rights held by us, Danisco or by others;
- Negative effects related to the stock or business performance of Danisco, our current and future collaborators and licensees, or the abandonment of projects using our technology by our collaborators and/or licensees;
- Scientific risks inherent to emerging technologies such as the C1-cell protein production platform or our other technologies;
- Set-backs, and/or failures, and or delays in our or our current and future collaborators' and licensees' R&D and commercialization programs;
- Delays or failure to receive regulatory approvals by us, Danisco and/or our current and future collaborators and licensees;
- Loss or expiration of our or Danisco's intellectual property rights;
- Theft, misappropriation or expiration of owned or licensed proprietary and intellectual property, genetic and biological material owned by us and/or Danisco US, Inc., and VTT Technical Research Centre of Finland Ltd;
- Lawsuits initiated by or against us, Danisco, or our current and future collaborators and licensees;
- Period-to-period fluctuations in our operating results;
- Future royalties from product sales, if any, by Danisco, our current or future strategic partners, collaborators or licensees;
- Future royalties may be owed to Danisco by us, our collaborators, licenses, or sub-licensees under certain circumstances related to our Danisco Pharma License;
- Short positions taken in our common stock;
- Sales of our common stock or other securities in the open market;
- Stock buy-back programs;
- Stock splits; and
- Decisions made by the board related to potential registration of Dyadic's stock under the Securities Act of 1933, as amended (the "Securities Act"), and/or up listing to another stock exchange.

If we were to become party to a securities class action suit, we could incur substantial legal fees and our management's attention and resources could be diverted from operating our business to responding to litigation.

Our quarterly and annual operating results may be volatile.

Our quarterly and annual operating results have fluctuated in the past and are likely to do so in the future. These fluctuations could cause our stock price to vary significantly or decline. Some of the factors that could impact our operating results include:

- Expiration of or cancellations of our research contracts with current and future collaborators and/or licensees, which may not be renewed or replaced;
- Setbacks or failures in our and our current and future collaborators' and licensees' research, development and commercialization efforts;
- Setbacks, or delays in our research and development efforts to develop and produce biologics;
- Setbacks, or delays in our research and development efforts to re-engineer the C1-cell protein production platform or our other technologies for their applications and use in developing and producing biologics;
- The speed, and success rate of our discovery and research and development efforts leading to potential licenses, or other forms of collaborations, access fees, milestones and royalties;
- The timing and willingness of current and future collaborators and licensees to utilize C1 to develop and commercialize their products which would result in potential upfront fees, milestones and royalties;
- General and industry specific economic conditions, which may affect our current and future collaborators' and licensees' R&D expenditures;
- The adoption and acceptance of the C1-cell protein production platform and our other technologies by biopharmaceutical and non-pharmaceutical companies and regulatory agencies;
- The addition or loss of one or more of the collaborative partners, grants, research funding, or licensees we are working with to further develop and commercialize our technologies and products in the pharmaceutical industry;
- Our ability to file, maintain and defend our intellectual property and to protect our proprietary information and trade secrets;
- Our ability to develop technology, products and processes that do not infringe on the intellectual property of third parties;
- The improvement and advances made by our competitors to CHO, *E.coli*, yeast, inset cells, plant and other expression systems;
- The introduction by our competitors of new discovery and expression technologies competitive with the C1-cell protein production platform;
- Our ability to enter into new research projects, grants, licenses or other forms of collaborations and generate revenue from such parties;
- Scientific risk associated with emerging technologies such as the C1-cell protein production platform;
- Failure to bring on the necessary research and manufacturing capacity, e.g., CRO, CMO (contract manufacturing organization), and CDMO (contract development and manufacturing organization), if required;
- Uncertainty regarding the timing of research funding, grants or upfront license fees for new C1-cell protein production platform, our other technologies, collaborations, license agreements or expanded license agreements; and
- Delays or failure to receive upfront fees, milestones and royalties and other payments.

Due to the possibility of fluctuations in our revenues and expenses, we believe that quarter-to-quarter comparisons of our operating results are not necessarily a good indication of our future performance. Our operating results in some quarters, or even in some years, may not meet the expectations of stock market analysts and investors, potentially causing our stock price to decline.

We do not expect to pay cash dividends in the future.

We have never paid cash dividends on our stock and do not anticipate paying any dividends for the foreseeable future. The payment of dividends on our stock, if ever, will depend on our earnings, financial condition and other business and economic factors deemed relevant for consideration by our board of directors. If we do not pay dividends, our stock may be less valuable because a return on investment will only occur if and to the extent that our stock price appreciates.

Our anti-takeover defense provisions may deter potential acquirers and depress our stock price.

Certain provisions of our certificate of incorporation, bylaws and Delaware law, as well as certain agreements we have with our executives, could make it substantially more difficult for a third party to acquire control of us. These provisions include the following:

- We may issue preferred stock with rights senior to those of our common stock;
- We have a classified board of directors;
- Action by written consent by stockholders is not permitted;
- Our board of directors has the exclusive right to fill vacancies and set the number of directors;
- Cumulative voting by our stockholders is not allowed; and
- We require advance notice for nomination of directors by our stockholders and for stockholder proposals.

These provisions may discourage certain types of transactions involving an actual or potential change in control. These provisions may also limit our stockholders' ability to approve transactions that they may deem to be in their best interests and discourage transactions in which our stockholders might otherwise receive a premium for their stock over the current market price.

Concentration of ownership among our existing officers, directors and principal stockholders may prevent other stockholders from influencing significant corporate decisions and depress our stock price.

Our executive officers, directors and principal stockholders (5% stockholders) together control approximately 35.1% of our 28,811,061 shares of outstanding common stock as of December 31, 2023.

Our Founder and Chief Executive Officer Mark Emalfarb, through the Mark A. Emalfarb Trust U/A/D October 1, 1987, as amended (the "MAE Trust") of which he is the trustee and beneficiary, owned approximately 15.7% of our outstanding common stock as of December 31, 2023. Further, the Francisco Trust U/A/D February 28, 1996 (the "Francisco Trust"), whose beneficiaries are the descendants and spouse of Mr. Emalfarb, owned approximately 12.3% of our outstanding common stock as of December 31, 2023. We have historically been partially controlled, managed and partially funded by Mr. Emalfarb, and affiliates of Mr. Emalfarb. Collectively, Mr. Emalfarb and stockholders affiliated with Mr. Emalfarb controlled approximately 28.0% of our outstanding common stock as of December 31, 2023.

Mr. Emalfarb may be able to control or significantly influence all matters requiring approval by our stockholders, including the election of directors and the approval of mergers or other business combination transactions. The interests of Mr. Emalfarb may not always coincide with the interests of other stockholders, and he may take actions that advance his personal interests and are contrary to the desires of our other stockholders.

If our existing officers, directors and principal stockholders act together, they will be able to exert a significant degree of influence over our management and affairs and over matters requiring stockholder approval, including the election of directors and approval of significant corporate transactions. In addition, this concentration of ownership may delay or prevent a change in control and might affect the market price of our stock, even when a change may be in the best interests of all stockholders. Certain of our principal stockholders may elect to increase their holdings of our common stock, which may have the impact of delaying or preventing a change of control. Moreover, the interests of this concentration of ownership may not always coincide with our interests or the interests of other stockholders, and, accordingly, they could cause us to enter into transactions or agreements, which we would not otherwise consider.

Future issuances of shares of our common stock may negatively affect our stock price.

The sale of additional shares of our common stock, or the perception that such sales could occur, could harm the prevailing market price of shares of our common stock. These sales, or the possibility that these sales may occur, also might make it more difficult for us to sell equity securities in the future at a time and at a price that we deem appropriate.

As of December 31, 2023, there were 28,811,061 shares of our common stock outstanding. Approximately 35.1% of these outstanding common shares are beneficially owned or controlled by our executive officers, directors and principal stockholders.

Our common stock has a relatively small public float. As a result, sales of substantial amounts of shares of our common stock, or even the potential for such sales, may materially and adversely affect prevailing market prices for our common stock. In addition, any adverse effect on the market price of our common stock could make it difficult for us to raise additional capital through sales of equity securities.

The Company is exposed to credit risk and fluctuations in the values of its investment portfolio.

The Company's investments can be negatively affected by liquidity, credit deterioration, financial results, market and economic conditions, political risk, sovereign risk, interest rate fluctuations or other factors. As a result, the value and liquidity of the Company's cash, cash equivalents, and marketable and non-marketable securities may fluctuate substantially, which could result in significant losses and could have a material adverse impact on the Company's financial condition and operating results.

We are a smaller reporting company, and the reduced disclosure requirements applicable to smaller reporting companies may make our common stock less attractive to investors.

We are a smaller reporting company and are therefore entitled to rely on certain reduced disclosure requirements, such as an exemption from providing selected financial data and executive compensation information. We are also exempt from the requirement to obtain an external audit on the effectiveness of internal control over financial reporting provided in Section 404(b) of the Sarbanes-Oxley Act. These exemptions and reduced disclosures in our filings with the Securities and Exchange Commission due to our status as a smaller reporting company mean our auditors do not review our internal control over financial reporting and may make it harder for investors to analyze our results of operations and financial prospects. We cannot predict if investors will find our common stock less attractive because we may rely on these exemptions. If some investors find our common stock less attractive as a result, there may be a less active trading market for our common stock, and our stock prices may be more volatile.

Item 1B. Unresolved Staff Comments

Not applicable.

Item 1C. Cybersecurity

Cybersecurity Risk Management and Strategy

We recognize the importance of assessing, identifying, and managing material risks associated with cybersecurity threats, as such term is defined in Item 106(a) of Regulation S-K. These risks include, among other things, operational risks, the risk of intellectual property theft, fraud, harm to employees or third parties with which we conduct business and violation of data privacy or security laws.

Identifying and assessing cybersecurity risk is integrated into our overall risk management systems and processes. We have established policies and controls for assessing, identifying and managing material cybersecurity risks and responding to material cybersecurity incidents.

We routinely assess material cybersecurity risks, including potential unauthorized occurrences on, or conducted through, our information systems that may compromise the confidentiality, integrity or availability of those systems or information maintained in them. We conduct periodic risk assessments to identify cybersecurity threats, as well as assessments when there is a material change in our business practices that we believe could affect information systems that are vulnerable to cybersecurity threats. These risk assessments include identifying reasonably foreseeable internal and external risks and the potential harm if the risks were to materialize. We conduct these risk assessments directly and also periodically engage third-party providers to support these processes.

Following these risk assessments, we evaluate how to appropriately implement and maintain reasonable safeguards to mitigate identified risks; reasonably address any identified gaps in existing safeguards; and regularly monitor the effectiveness of our safeguards. We have implemented cybersecurity tools, conducted employee training, and monitored emerging laws and regulations related to data protection and information security. We may also [obligate] certain third-party business partners to certify that they can implement and maintain appropriate security measures, consistent with all applicable laws, in connection with their work for us, and to promptly report any suspected breach of their security measures that may affect the Company.

Cybersecurity events and data incidents are evaluated, assessed based on severity and prioritized for response and remediation. Under our incident response policies, incidents are evaluated to determine materiality as well as operational and business impact and reviewed for privacy impact.

We have not, to date, experienced a cybersecurity incident that was determined to be material, although, like any technology provider, we have experienced incidents in the past. Despite our cybersecurity efforts, we may not be successful in preventing or mitigating a cybersecurity incident that could have a material adverse effect on our business. For additional information regarding whether any risks from cybersecurity threats are reasonably likely to materially affect our company, including our business strategy, results of operations, or financial condition, please refer to Item 1A, “Risk Factors,” in this Annual Report on Form 10-K.

Cybersecurity Governance

Cybersecurity is an important part of our risk management processes and an area of focus for our board of directors and management team. Our board of directors has delegated responsibility to the Audit Committee for the oversight of risks from cybersecurity threats. Members of the Audit Committee receive regular updates from senior management, including leaders from our information technology, legal and compliance teams regarding matters of cybersecurity. This includes existing and new cybersecurity risks, information on how management is addressing and/or mitigating those risks, cybersecurity incidents (if any) and the status on key information security initiatives.

Our Chief Executive Officer and Chief Financial Officer are principally responsible for overseeing the cybersecurity risk management program, in partnership with outside consultants, as well as managing and responding to material cyber incidents if any occur. They will provide periodic briefings to the Audit Committee and to the Board of Directors about our cybersecurity risks and activities, including cybersecurity incidents and responses, cybersecurity systems testing, third-party activities and related topics. In addition, our policies for managing and responding to cybersecurity incidents include procedures for appropriate escalations to our Audit Committee Chair.

Item 2. Properties

Leases

Jupiter, Florida Headquarters

The Company’s prior lease for its corporate headquarters located at 140 Intracoastal Pointe Dr. located in Jupiter Florida, expired on August 31, 2023. In August 2023, the Company entered into a new lease comprising approximately 1,719 square feet of office space located at 1044 N US 1, Jupiter, Florida, commencing September 1, 2023 (“Commencement Date”). Rent is subject to three percent (3%) annual increases, and the Company is responsible for certain common area maintenance charges and taxes throughout the life of the lease. The lease has an initial term of three (3) years, following the Commencement Date with an option to extend for two (2) successive one (1) year terms. The option to extend were not included in the lease term used in determining the right-of-use asset or lease liability, as the Company did not consider it reasonably certain that it would exercise the option.

The Netherlands Office

The Company maintains a small satellite office in Wageningen, The Netherlands. The Company occupies a flexible office space for an annual rental rate of approximately $4,800. The lease expires on January 31, 2025, and thereafter, the Company will reconsider the leased space to align with the future operations of the Company.

We believe that our current office spaces are adequate to meet our needs for the immediate future, and that, should it be needed, suitable additional space is available to accommodate any expansion of our operations, but such space may not be available in the same building if and when such space is needed.

Item 3. Legal Proceedings

We are not currently involved in any litigation that we believe could have a materially adverse effect on our financial condition or results of operations. There is no action, suit, proceeding, inquiry or investigation before or by any court, public board, government agency, self-regulatory organization or body pending or, to the knowledge of the executive officers of our Company or any of our subsidiaries, threatened against or affecting our Company, our common stock, any of our subsidiaries or of our Company’s or our Company’s subsidiaries’ officers or directors in their capacities as such, in which an adverse decision could have a material adverse effect.

However, from time to time, we may become involved in various lawsuits and legal proceedings which arise in the ordinary course of business. Litigation is subject to inherent uncertainties, and an adverse result in these or other matters may arise from time to time that may harm our business.

Item 4. Mine Safety Disclosures

Not applicable for our operations.

PART II

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

Market Information

As of December 31, 2023, Dyadic had two classes of capital stock authorized, common stock and preferred stock. Effective April 17, 2019, our common stock began trading on the NASDAQ Stock Market LLC's NASDAQ Capital Market, under the symbol "DYAI". There were no shares of preferred stock outstanding for the reported period. The number of record holders of our common stock as of December 31, 2023 was 50, including The Depository Trust Company, which holds shares of our common stock on behalf of an indeterminate number of beneficial owners. We have never declared or paid any dividends in the past. Any future determination to pay dividends will be at the discretion of our Board of Directors (the "Board").

Securities Authorized for Issuance Under Equity Compensation Plans

See Part III, Item 12.

Equity Performance Graph

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

Recent Sales of Unregistered Securities

None.

Issuer Purchases of Equity Securities

None.

Item 6. [Reserved]

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

The following discussion and analysis of financial condition and results of operations should be read in conjunction with the financial statements and the notes to those statements appearing in this Annual Report. Some of the information contained in this discussion and analysis or set forth elsewhere in this Annual Report, including information with respect to our plans and strategy for our business, includes forward-looking statements that involve risks, assumptions and uncertainties. Important factors that could cause actual results to differ materially from the results described in or implied by the forward-looking statements contained in the following discussion and analysis include, but not limited to those set forth in "Item 1A. Risk Factors" in this Annual Report. All forward-looking statements included in this Annual Report are based on information available to us as of the time we file this Annual Report and, except as required by law, we undertake no obligation to update publicly or revise any forward-looking statements.

Overview

Description of Business

Dyadic International, Inc. ("Dyadic", "we", "us", "our", or the "Company") is a global biotechnology company based in Jupiter, Florida with operations in the United States and a satellite office in the Netherlands, and it utilizes several third-party consultants and research organizations to carry out the Company's activities. Over the past two plus decades, the Company has developed a gene expression platform for producing commercial quantities of industrial enzymes and other proteins, and has previously licensed this technology to third parties, such as Abengoa Bioenergy SA, BASF SE, Codexis, Inc. and others, for use in industrial (non-pharmaceutical) applications. This technology is based on the *Thermothelomyces heterothallica* (formerly known as *Myceliophthora thermophila*) fungus, which the Company named C1.

On December 31, 2015, the Company sold its industrial technology business to Danisco USA ("Danisco"), the industrial biosciences business of DuPont (NYSE: DD) (the "DuPont Transaction"). As part of the DuPont Transaction, Dyadic retained co-exclusive rights to the C1-cell protein production platform for use in all human and animal pharmaceutical applications, and currently the Company has the exclusive ability to enter into sub-license agreements (subject to the terms of the license and to certain exceptions) for use in all human and animal pharmaceutical applications. Danisco retained certain rights to utilize the C1-cell protein production platform in pharmaceutical applications, including the development and production of pharmaceutical products, for which it will be required to make royalty payments to Dyadic upon commercialization. In certain circumstances, Dyadic may owe a royalty to either Danisco or certain licensors of Danisco, depending upon whether Dyadic elects to utilize certain patents either owned by Danisco or licensed in by Danisco.

After the DuPont Transaction, the Company has been building innovative microbial platforms to address the growing demand for global protein bioproduction and unmet clinical needs for effective, affordable, and accessible biopharmaceutical products for human and animal health and for other biologic products for use in non-pharmaceutical applications.

The C1-cell protein production platform is a robust and versatile thermophilic filamentous fungal expression system for the development and production of biologic products including enzymes and other proteins for human and animal health. Some examples of human and animal vaccines and drugs which have the potential to be produced from C1-cells are protein antigens, ferritin nanoparticles, virus-like particles ("VLPs"), monoclonal antibodies ("mAbs"), Bi/Tri-specific antibodies, Fab antibody fragments, Fc-fusion proteins, as well as other therapeutic enzymes and proteins. The Company is involved in multiple funded research collaborations with animal and human pharmaceutical companies which are designed to leverage its C1-cell protein production platform to develop innovative vaccines and drugs, biosimilars and/or biobetters.

The Company also developed the Dapibus™ thermophilic filamentous fungal based microbial protein production platform to enable the rapid development and large-scale manufacture of low-cost proteins, metabolites, and other biologic products for use in non-pharmaceutical applications, such as food, nutrition, and wellness.

Critical Accounting Estimates

The preparation of these consolidated financial statements in accordance with U.S. generally accepted accounting principles ("GAAP") requires management to make estimates that affect the reported amount of assets and liabilities and related disclosure of contingent assets and liabilities at the date of our consolidated financial statements and the reported amounts of revenues and expenses during the applicable period. Actual results may differ from these estimates under different assumptions or conditions. Such differences could be material to the consolidated financial statements.

We define critical accounting estimates as those that are reflective of significant judgments and uncertainties and which may potentially result in materially different results under different assumptions and conditions. In applying these critical accounting estimates, our management uses its judgment to determine the appropriate assumptions to be used in making certain estimates. These estimates are subject to an inherent degree of uncertainty. Our critical accounting estimates include the following:

Revenue Recognition

The Company has no products approved for sale. All our revenue to date has been research revenue from third-party collaborations and government grants, as well as revenue from sublicensing agreements and collaborative arrangements, which may include upfront payments, options to obtain a license, payment for research and development services, milestone payments and royalties, in the form of cash or non-cash considerations (e.g., minority equity interest).

Revenue related to research collaborations and agreements: The Company typically performs research and development services as specified in each respective agreement on a best-efforts basis, and recognizes revenue from research funding under collaboration agreements in accordance with the 5-step process outlined in ASC Topic 606 ("Topic 606"): (i) identify the contract(s) with a customer; (ii) identify the performance obligations in the contract; (iii) determine the transaction price; (iv) allocate the transaction price to the performance obligations in the contract; and (v) recognize revenue when (or as) the entity satisfies a performance obligation. We recognize revenue when we satisfy a performance obligation by transferring control of the service to a customer in an amount that reflects the consideration that we expect to receive. Depending on how the performance obligation under our license and collaboration agreements is satisfied, we recognize the revenue either at a point in time or over time by using the input method under Topic 606 to measure the progress toward complete satisfaction of a performance obligation.

Under the input method, revenue will be recognized based on the entity's efforts or inputs to the satisfaction of a performance obligation (e.g., resources consumed, labor hours expended, costs incurred, or time elapsed) relative to the total expected inputs to the satisfaction of that performance obligation. The Company believes that the cost-based input method is the best measure of progress to reflect how the Company transfers its performance obligation to a customer. In applying the cost-based input method of revenue recognition, the Company uses actual costs incurred relative to budgeted costs to fulfill the performance obligation. These costs consist primarily of full-time equivalent effort and third-party contract costs. Revenue will be recognized based on actual costs incurred as a percentage of total budgeted costs as the Company completes its performance obligations.

A cost-based input method of revenue recognition requires management to make estimates of costs to complete the Company's performance obligations. In making such estimates, significant judgment is required to evaluate assumptions related to cost estimates. The cumulative effect of revisions to estimated costs to complete the Company's performance obligations will be recorded in the period in which changes are identified and amounts can be reasonably estimated. A significant change in these assumptions and estimates could have a material impact on the timing and amount of revenue recognized in future periods.

Revenue related to grants: The Company may receive grants from governments, agencies, and other private and not-for-profit organizations. These grants are intended to be used to fund the Company's research collaborations partially or fully, including opportunities and projects that the Company is pursuing with certain collaborators. However, most, if not all, of such potential grant revenues, if received, is expected to be earmarked for third parties to advance the research required, including preclinical and clinical trials for vaccines and/or antibodies candidates.

Revenue related to sublicensing agreements:
If the sublicense to the Company's intellectual property is determined to be distinct from the other performance obligations identified in the arrangement, the Company recognizes revenue allocated to the license when technology is transferred to the customer and the customer can use and benefit from the license.

Customer options: If the sublicensing agreement includes customer options to purchase additional goods or services, the Company will evaluate if such options are considered material rights to be deemed as separate performance obligations at the inception of each arrangement.

Milestone payments: At the inception of each arrangement that includes development, commercialization, and regulatory milestone payments, the Company evaluates whether the achievement of the milestones is considered probable and estimates the amount to be included in the transaction price. If the milestone payment is in exchange for a sublicense and is based on the sublicensee's subsequent sale of product, the Company recognizes milestone payment by applying the accounting guidance for royalties. To date, the Company has not recognized any milestone payment revenue resulting from any of its sublicensing arrangements.

Royalties: With respect to licenses deemed to be the predominant item to which the sales-based royalties relate, including milestone payments based on the level of sales, the Company recognizes revenue at the later of (i) when the related sales occur or (ii) when the performance obligation to which some or all of the royalty has been allocated has been satisfied (or partially satisfied). To date, the Company has not recognized any royalty revenue resulting from any of its sublicensing arrangements.

We invoice customers based on our contractual arrangements with each customer, which may not be consistent with the period that revenues are recognized. When there is a timing difference between when we invoice customers and when revenues are recognized, we record either a contract asset (unbilled accounts receivable) or a contract liability (deferred research and development obligations), as appropriate. If upfront fees or considerations related to sublicensing agreement are received prior to the technology transfer, the Company will record the amount received as deferred revenue from licensing agreement.

We are not required to disclose the value of unsatisfied performance obligations for (i) contracts with an original expected length of one year or less and (ii) contracts for which we recognize revenue at the amount to which we have the right to invoice for services performed.

The Company adopted a practical expedient to expense sales commissions when incurred because the amortization period would be one year or less.

Accrued Research and Development Expenses

In order to properly record services that have been rendered but not yet billed to the Company, we review open contracts and purchase orders, communicate with our personnel and we estimate the level of service performed and the associated cost incurred for the service when we have not yet been invoiced or otherwise notified of the actual cost. The majority of our service providers invoice us monthly or quarterly in arrears for services performed or when contractual milestones are met. We make estimates of our accrued expenses as of each balance sheet date in our consolidated financial statements based on facts and circumstances known to us at that time. We periodically confirm the accuracy of our estimates with the service providers and adjust if necessary. Examples of accrued research and development expenses include amounts owed to contract research organizations, to service providers in connection with research and development activities.

Stock-Based Compensation

We have granted stock options to employees, directors and consultants. The fair value of each option award is estimated on the date of grant using the Black-Scholes option-pricing model. The Black-Scholes model considers volatility in the price of our stock, the risk-free interest rate, the estimated life of the option, the closing market price of our stock and the exercise price. For purposes of the calculation, we assumed that no dividends would be paid during the life of the options. We also used the weighted-average vesting period and contractual term of the option as the best estimate of the expected life of a new option, except for the options granted to the CEO (i.e., 5 or 10 years) and certain contractors (i.e., 1 or 3 years). The expected stock price volatility was calculated based on the Company's own volatility since the DuPont Transaction. The Company reviews its volatility assumption on an annual basis and has used the Company's historical volatilities since 2016, as the DuPont Transaction resulted in significant changes in the Company's business and capital structure.

The estimates utilized in the Black-Scholes calculation involve inherent uncertainties and the application of management judgment. These estimates are neither predictive nor indicative of the future performance of our stock. As a result, if other assumptions had been used, our recorded share-based compensation expense could have been materially different from that reported. In addition, because some of the performance-based options issued to employees, consultants and other third-parties vest upon the achievement of certain milestones, the total ultimate expense of share-based compensation is uncertain.

Accounting for Income Taxes

The Company accounts for income taxes under the asset and liability method in accordance with ASC Topic 740, "Income Taxes". Under this method, income tax expense /(benefit) is recognized for: (i) taxes payable or refundable for the current year and (ii) deferred tax consequences of temporary differences resulting from matters that have been recognized in an entity's financial statements or tax returns. Deferred tax assets and liabilities are measured using enacted tax rates expected to apply to taxable income in the years in which those temporary differences are expected to be recovered or settled. The effect on deferred tax assets and liabilities of a change in tax rates is recognized in the results of operations in the period that includes the enactment date. A valuation allowance is provided to reduce the deferred tax assets reported if based on the weight of the available positive and negative evidence, it is more likely than not some portion or all the deferred tax assets will not be realized.

In determining taxable income for the Company's consolidated financial statements, we are required to estimate income taxes in each of the jurisdictions in which we operate. This process requires the Company to make certain estimates of our actual current tax exposure and assessment of temporary differences between the tax and financial statement recognition of revenue and expense. In evaluating the Company's ability to recover its deferred tax assets, the Company must consider all available positive and negative evidence including its past operating results, the existence of cumulative losses in the most recent years and its forecast of future taxable income. Significant management judgment is required in determining our provision for income taxes, deferred tax assets and liabilities and any valuation allowance recorded against our net deferred tax assets.

The Company is required to evaluate the provisions of ASC 740 related to the accounting for uncertainty in income taxes recognized in a company's financial statements. ASC 740 prescribes a comprehensive model for how a company should recognize, present, and disclose uncertain positions that the company has taken or expects to take in its tax return. For those benefits to be recognized, a tax position must be more-likely-than-not to be sustained upon examination by taxing authorities. Differences between tax positions taken or expected to be taken in a tax return and the net benefit recognized and measured pursuant to the interpretation are referred to as "unrecognized benefits." A liability should be recognized (or amount of net operating loss carry forward or amount of tax refundable is reduced) for unrecognized tax benefits, because it represents a company's potential future obligation to the taxing authority for a tax position that was not recognized because of applying the provision of ASC 740.

The Company classifies accrued interest and penalties related to its tax positions as a component of income tax expense. The Company currently is not subject to U.S. federal, state and local tax examinations by tax authorities for the years before 2017. See Note 4 to the Consolidated Financial Statements.

Off-Balance Sheet Arrangements

We do not have any off-balance sheet arrangements.

Recent Accounting Pronouncements

See Note 1 to the Consolidated Financial Statements for information about recent accounting pronouncements.

Results of Operations

Year Ended December 31, 2023 Compared to the Year Ended December 31, 2022

Revenue and Cost of Revenue

The following table summarizes the Company's revenue and cost of research and development revenue for the years ended December 31, 2023 and 2022:

	Year Ended December 31,	
	2023	2022
Research and development revenue	$ 2,545,865	$ 2,683,244
License revenue	$ 352,941	$ 247,059
Cost of research and development revenue	$ 1,975,849	$ 2,123,193

For the years ended December 31, 2023 and 2022, the Company's revenue was generated from sixteen and fourteen collaborations, respectively. The decrease in revenue and cost of research and development revenue was due to higher individual contract amounts on certain research funding and related work performed during 2022. The license revenue for the year ended December 31, 2023 was in connection with the Janssen license agreement, and for the year ended December 31, 2022 was in connection with the Phibro/Abic and Janssen license agreements.

Research and Development Expenses

Research and development costs are expensed as incurred and primarily include salary and benefits of research personnel, third-party contract research organization services and supply costs.

Research and development expenses for the year ended December 31, 2023 decreased to $3.3 million compared to $4.5 million for the year ended December 31, 2022. The decrease primarily reflected the winding down of activities related to the Company's Phase 1 clinical trial of DYAI-100 COVID-19 vaccine candidate.

General and Administrative Expenses

General and administrative expenses for the year ended December 31, 2023, decreased to $5.8 million compared to $6.4 million for the year ended December 31, 2022. The decrease principally reflected a decrease in management incentives of $466,000, business development and investor relations costs of $219,000, and legal expenses of $39,000, partially offset by increases insurance premiums of $96,000, and other increases of $24,000.

Foreign Currency Exchange

Foreign currency exchange loss for the year ended December 31, 2023 was $38,000 compared to $50,000 for the year ended December 31, 2022. The decrease reflected the currency fluctuation of the Euro in comparison to the U.S. dollar.

Interest Income

Interest income for the year ended December 31, 2023, increased to $417,000 compared to $180,000 for the year ended December 31, 2022. The increase was primarily due to an increase in interest rates and yield on the Company's investment grade securities, which are classified as held-to-maturity.

Other Income

For the year ended December 31, 2023, the Company had a gain of approximately $1.0 million from the sale of the Company's equity interest in Alphazyme, LLC. For the year ended December 31, 2022, the Company received a settlement payment of $250,000 from the termination of a proposed license and collaboration.

Income Taxes

The Company had net operating loss ("NOL") carryforwards available as of December 31, 2023 and 2022, in the amount of approximately $45.9 million and $44.0 million, respectively. Approximately $42.9 million of the net operating loss carryforwards will be carried forward indefinitely and will be available to offset 80% of taxable income. The remaining amount of the net operating loss carryforwards will expire at varying dates through 2037.

Net Loss

Net loss for the year ended December 31, 2023 was $6.8 million compared to a net loss of $9.7 million for the year ended December 31, 2022. The decrease in net loss of $2.9 million was principally due to decreases in research and development expenses of $1.2 million, general and administrative expenses of $605,000, and partially offset by an increase in other income of $768,000.

Liquidity and Capital Resources

Our primary source of cash to date has been the cash received from the DuPont Transaction in 2015, interest income received from investment grade securities, revenues from our research collaboration agreements and license agreements, and funds from the exercise of employee stock options. For the year ended December 31, 2023, the Company received $1.3 million from the sale of its equity interest in Alphazyme, LLC and $600,000 upfront payment for a product development and licensing agreement.

On March 8, 2024, the Company sold and issued an aggregate principal amount of $6.0 million of its 8.0% Senior Secured Convertible Promissory Notes due March 8, 2027 (the "Convertible Notes") in a private placement in reliance on the exemption from registration provided by Section 4(a)(2) of the Securities Act of 1933, as amended (the "Securities Act"). The purchasers of the Convertible Notes include immediate family members and family trusts related to Mark Emalfarb, our President and Chief Executive Officer and a member of our Board of Directors, including The Francisco Trust, an existing holder of more than 5% of the Company's outstanding common stock, (collectively, the "Purchasers"). The net proceeds from the sale of the Convertible Notes, after deducting offering expenses, are approximately $5,850,000. The Company intends to use the net proceeds from the offering of the Convertible Notes for working capital and general corporate purposes.

The Convertible Notes will be senior, secured obligations of Dyadic and its affiliates, and interest will be payable quarterly in cash on the principal amount equal to 8% per annum. The Convertible Notes will mature on March 8, 2027 (the "Maturity Date"), unless earlier converted, repurchased, or redeemed in accordance with the terms of the Convertible Notes.

The Convertible Notes will be convertible into shares of Dyadic's Class A common stock (the "Common Stock"), at the option of the holders of the Convertible Notes (the "Noteholders") at any time prior to the Maturity Date. The conversion price is $1.79 per share of the Common Stock, which is equal to 125% of the trailing 30-day VWAP of the Common Stock ending on the trading day immediately preceding the date of the securities purchase agreement. For more information regarding the Convertible Notes, including the covenants related thereto see Note 8 to the Consolidated Financial Statements.

This private placement funding strengthened our financial position, and it will support our near term revenue growth and accelerate our strategic objective of commercialization opportunities for pharmaceutical and non-pharmaceutical applications. The Company has received successful top-line results for the Phase 1 clinical trial of DYAI-100, and we do not plan to continue Phase 2/3 clinical trials unless funding is secured.

Our ability to achieve profitability depends on many factors, including our scientific results and our ability to continue to obtain funded research and development collaborations from industry and government programs, as well as sub-license agreements. We may continue to incur substantial operating losses even if we begin to generate revenues from research and development and licensing. Our primary future cash needs are expected to be for general operating activities, including our business development and research expenses, as well as legal and administrative costs as an SEC reporting and NASDAQ listed company. Our future cash requirements will depend on many factors, including those factors discussed under Item 1A. Risk Factors.

As of December 31, 2023, we had an accumulated deficit of $80.3 million. We expect to incur losses and have negative net cash flows from operating activities as we continue developing our microbial platforms and related products, and as we expand our pipeline and engage in further research and development activities for internal products as well as for our third-party collaborators and licensees. The success of the Company depends on its ability to develop its technologies and products to the point of regulatory approval and subsequent revenue generation or through sublicensing of the Company's technologies and products, to raise enough capital to finance these developmental efforts.

We expect our existing cash and cash equivalents and cash raised from the Convertible Notes, investments in debt securities, and operating cash flows will be sufficient to meet our operational, business, and other liquidity requirements for at least the next twelve (12) months from the date of issuance of the financial statements contained in this Form 10-K. However, we have based this estimate on assumptions that may prove to be wrong, and our operating plan may change because of many factors currently unknown. In the event our financing needs are not able to be met by our existing cash, cash equivalents and investments, we would seek to raise additional capital through strategic financial opportunities that could include, but are not limited to, future public or private equity offerings, collaboration agreements, and/or other means. Any amounts raised may be used for the further development and commercialization of product candidates, and for other working capital purposes. There is no guarantee that any of these strategic or financing opportunities will be executed or realized on favorable terms, if at all, and some could be dilutive to existing shareholders.

At December 31, 2023, cash and cash equivalents were $6.5 million compared to $5.8 million at December 31, 2022. The carrying value of investment grade securities, including accrued interest at December 31, 2023 was $0.8 million compared to $6.9 million at December 31, 2022.

Net cash used in operating activities for the year ended December 31, 2023 of $6.7 million resulted from a net loss of $6.8 million adjusted for share-based compensation expenses of $1.2 million, partially offset by sale of our investment in Alphazyme of $1.0 million, and changes in operating assets and liabilities of $0.1 million.

Net cash used in operating activities for the year ended December 31, 2022 of $8.1 million resulted from a net loss of $9.7 million adjusted for share-based compensation expenses of $1.9 million, offset by changes in operating assets and liabilities of $0.3 million.

Net cash provided by investing activities for the year ended December 31, 2023 was $7.5 million compared to net cash used in investing activities of $2.4 million for the year ended December 31, 2022. Cash flows from investing activities in 2023 were primarily related to proceeds from maturities, net of purchases of investment grade debt securities, and proceeds from the sale of investment in Alphazyme. Cash flows from investing activities in 2022 were primarily related to proceeds from maturities, net of purchases of investment grade debt securities.

There was no net cash provided by financing activities for the year ended December 31, 2023 compared to $544,000 for the year ended December 31, 2022. Cash flows from financing activities in 2022 were primarily related to proceeds received from the exercise of stock options.

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 are not required to provide the information required under this item.

Item 8. Financial Statements and Supplementary Data

The Consolidated Financial Statements and supplementary data required by this item are presented elsewhere in this report beginning on page F-1, in the order shown below:

Report of Independent Registered Public Accounting Firm (PCAOB ID 173)

Report of Independent Registered Public Accounting Firm (PCAOB ID 199)

Consolidated Balance Sheets as of December 31, 2023 and 2022 Consolidated Statements of Operations for the years ended December 31, 2023, 2022

Consolidated Statements of Stockholders' Equity for the years ended December 31, 2023 and 2022

Consolidated Statements of Cash Flows for the years ended December 31, 2023 and 2022

Notes to Consolidated Financial Statements

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

None.

Item 9A. Controls and Procedures

Evaluation of Disclosure Controls and Procedures

Our management, with the participation of our Chief Executive Officer and our Chief Financial Officer, evaluated the effectiveness of our disclosure controls and procedures as of December 31, 2023. The term "disclosure controls and procedures," as defined in Rules 13a-15(e) and 15d-15(e) under the Securities Exchange Act of 1934, as amended, or the Exchange Act, means controls and other procedures of a company that are designed to ensure that information required to be disclosed by a company in the reports that it files or submits under the Exchange Act is recorded, processed, summarized and reported within the time periods specified in the SEC rules and forms. Based on the evaluation of our disclosure controls and procedures as of December 31, 2023, our Chief Executive Officer and Chief Financial Officer concluded that, as of such date, our disclosure controls and procedures were effective.

Management's Report on Internal Control Over Financial Reporting

Our 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. Our management assessed the effectiveness of our internal control over financial reporting as of December 31, 2023 based on the criteria set forth in the Internal Control-Integrated Framework (2013) issued by the Committee of Sponsoring Organizations of the Treadway Commission. Based on the assessment, our management has concluded that our internal control over financial reporting was effective as of December 31, 2023. This Annual Report does not include an attestation report of our independent registered public accounting firm regarding internal control over financial reporting. Management's report was not subject to attestation by our independent registered public accounting firm pursuant to the rules of the SEC that permit us to provide only management's report in this Annual Report because we are a "smaller reporting company."

Changes in Internal Controls Over Financial Reporting

There were no changes in our internal control over financial reporting identified in connection with the evaluation required by Rules 13a-15(d) and 15d-15(d) of the Exchange Act that occurred during the year ended December 31, 2023 that materially affected, or are reasonably likely to materially affect, our internal control over financial reporting.

Inherent Limitation on Effectiveness of Controls

A control system, no matter how well conceived and operated, can provide only reasonable, not absolute, assurance that the objectives of the control system are met. Further, the design of a control system must reflect the fact that there are resource constraints, and the benefits of controls must be considered relative to their costs. Because of the inherent limitations in all control systems, no evaluation of controls can provide absolute assurance that all control issues and instances of fraud, if any, within our Company have been detected. These inherent limitations include the realities that judgments in decision-making can be faulty and that breakdowns can occur because of a simple error or mistake. Additionally, controls can be circumvented by the individual acts of some persons, by collusion of two or more people, or by management override of the controls. The design of any system of controls is also based in part upon certain assumptions about the likelihood of future events, and there can be no assurance that any design will succeed in achieving its stated goals under all potential future conditions; over time, controls may become inadequate because of changes in conditions, or because the degree of compliance with policies or procedures may deteriorate. Because of the inherent limitations in a cost-effective control system, misstatements due to error or fraud may occur and not be detected.

Item 9B. Other Information

Insider Trading Arrangements

During the quarter ended December 31, 2023, none of our directors or officers (as defined in Rule 16a-1 under the Securities Exchange Act of 1934, as amended) adopted or terminated a "Rule 10b5-1 trading arrangement" or a "non-Rule 10b5-1 trading arrangement" (each as defined in Item 408(a) and (c), respectively, of Regulation S-K).

Item 9C. Disclosure Regarding Foreign Jurisdictions That Prevent Inspections

Not applicable.

PART III

Item 10. Directors, Executive Officers and Corporate Governance

The information required by this item is incorporated by reference to the Company's definitive proxy statement relating to the 2024 annual meeting of shareholders. The definitive proxy statement will be filed with the Securities and Exchange Commission within 120 days after the end of the 2023 fiscal year.

Item 11. Executive Compensation

The information required by this item is incorporated by reference to the Company's definitive proxy statement relating to the 2024 annual meeting of shareholders. The definitive proxy statement will be filed with the Securities and Exchange Commission within 120 days after the end of the 2023 fiscal year.

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

The information required by this item is incorporated by reference to the Company's definitive proxy statement relating to the 2024 annual meeting of shareholders. The definitive proxy statement will be filed with the Securities and Exchange Commission within 120 days after the end of the 2023 fiscal year.

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

The information required by this item is incorporated by reference to the Company's definitive proxy statement relating to the 2024 annual meeting of shareholders. The definitive proxy statement will be filed with the Securities and Exchange Commission within 120 days after the end of the 2023 fiscal year.

Item 14. Principal Accounting Fees and Services

The information required by this item is incorporated by reference to the Company's definitive proxy statement relating to the 2024 annual meeting of shareholders. The definitive proxy statement will be filed with the Securities and Exchange Commission within 120 days after the end of the 2023 fiscal year.

PART IV

Item 15. Financial Statement and Exhibits

(a) Financial Statement

Our financial statements and related notes thereto are listed and included in this Annual Report on Form 10-K beginning on page F-1.

(b) Exhibits

Exhibit No.	Description of Exhibit	Incorporated by Reference			Filed Herewith
		Form	Original No.	Date Filed	
3.1#	Restated Certificate of Incorporation dated November 1, 2004	10-12G	3.1	January 14, 2019	
3.2#	Third Amended and Restated Bylaws dated March 28, 2023	8-K	3.1	March 29, 2023	
4.1#	Specimen Stock Certificate Evidencing Shares of Common Stock	10-12G	4.1	January 14, 2019	
4.2#	Description of Registered Securities	10-K	4.2	March 30, 2020	
4.3#	Senior Secured Convertible Promissory Note due March 8, 2027, dated March 8, 2024	8-K	4.1	March 11, 2024	
10.1**#	Dyadic International, Inc. 2011 Equity Incentive Plan	10-12G	10.2	January 14, 2019	
10.2**#	Dyadic International, Inc. 2021 Equity Incentive Plan	S-8	4.3	August 12, 2021	
10.2.1**	Form of Stock Option Agreement Pursuant to the Dyadic International, Inc. 2021 Equity Incentive Plan				x
10.2.2**	Form of Restricted Stock Unit Agreement Pursuant to the Dyadic International, Inc. 2021 Equity Incentive Plan				x
10.3**#	Form of Restricted Stock Unit Agreement Pursuant to the Dyadic International, Inc. 2011 Equity Incentive Plan	10-12G	10.3	January 14, 2019	
10.4**#	Form of Stock Option Agreement Pursuant to the Dyadic International, Inc. 2011 Equity Incentive Plan	10-12G	10.4	January 14, 2019	
10.5**#	Employment Agreement, dated June 16, 2016, and First Amendment dated January 23, 2017, by and between Dyadic International, Inc. and Mark A. Emalfarb	10-12G	10.5	January 14, 2019	
10.5.1**#	Second Amendment to Employment Agreement between Dyadic International, Inc. and Mark A. Emalfarb, dated as of November 12, 2019	8-K	10.1	November 13, 2019	
10.6**#	Consulting Agreement, dated January 1, 2016, by and between Dyadic Netherlands B.V. and Sky Blue Biotech kft on behalf of Ronen Tchelet	10-12G	10.7	January 14, 2019	
10.7**#	Compensation Letter, dated March 26, 2018, by and between Dyadic International, Inc. and Ping W. Rawson	10-12G	10.9	January 14, 2019	
10.8**#	Employment Agreement between Dyadic International Inc. and Joseph Hazelton dated November 9, 2021	8-K	10.1	November 9, 2021	
10.9**#	Form of Director and Officer Indemnification Agreement	10-12G	10.10	January 14, 2019	
10.10#	Lease Agreement with Jupiter Harbour Office, LLC dated August 19, 2023	10-Q	10.1	November 8, 2023	
10.11†#	Pharma License Agreement with Danisco US, Inc. dated December 31, 2015	10-12G	10.12	January 14, 2019	
10.12†#	Commission Contract with VTT Technical Research Centre of Finland Ltd dated September 2, 2016	10-12G	10.13	January 14, 2019	
10.12.1†#	Commission Contract with VTT Technical Research Centre of Finland Ltd dated June 28, 2019	8-K	10.1	July 5, 2019	
10.13†#	Service Framework Agreement with Biotechnology Developments for Industry in Pharmaceuticals, S.L.U. dated June 30, 2017	10-Q	10.2	November 8, 2023	
10.13.1†#	Amendment No. 1 dated July 26, 2021, to the Service Framework Agreement dated June 30, 2017	8-K	10.3	July 27, 2021	
10.14†#	License Agreement with VTT Technical Research Centre of Finland Ltd dated July 17, 2017	10-12G	10.17	January 14, 2019	
10.15†#	Joint Development Agreement with Leprino Foods Company, dated May 12, 2022	8-K	10.1	May 11, 2022	

10.16†#	Research and Commercialization Collaboration Agreement with Serum Institute of India Pvt. Ltd., dated May 7, 2019	8-K	10.1	May 8, 2019	
10.17†#	Non-Exclusive Sublicense Agreement among Dyadic International, Inc., Alphazyme, LLC, dated May 5, 2019	8-K	10.1	May 8, 2019	
10.17.1†#	Amended and Restated Non-Exclusive Sublicense Agreement among Dyadic International, Inc., Alphazyme, LLC, dated June 24, 2020	8-K	10.1	June 29, 2020	
10.18#	Master Services Agreement and Work Order, between Dyadic International (USA), Inc. and CR2O B.V., Dated May 28, 2021	8-K	10.1	June 3, 2021	
10.19†#	Alphazyme Sale Agreement dated January 18, 2023	8-K	10.1	January 23, 2023	
10.20†#	RUBIC License Agreement dated April 6, 2023	8-K	10.1	April 6, 2023	
10.21†#	Inzyme Development and Exclusive License Agreement, effective September 18, 2023	8-K	10.1	September 19, 2023	
10.22#	Securities Purchase Agreement Relating to the Senior Secured Convertible Promissory Note dated March 8, 2024	8-K	10.1	March 11, 2024	
10.23#	Registration Rights Agreement Relating to the Senior Secured Convertible Promissory Note dated March 8, 2024	8-K	10.2	March 11, 2024	
10.24#	Security Agreement Relating to the Senior Secured Convertible Promissory Note dated March 8, 2024	8-K	10.3	March 11, 2024	
10.25#	Subsidiary Guarantee Relating to the Senior Secured Convertible Promissory Note dated March 8, 2024	8-K	10.4	March 11, 2024	
21.1	Subsidiaries of the Registrant				x
23.1	Consent of Independent Registered Public Accounting Firm - Crowe LLP				x
23.2	Consent of Independent Registered Public Accounting Firm - Mayer Hoffman McCann				x
24.1	P.C. Power of Attorney (included on signature page)				^
31.1	Certification of Chief Executive Officer of Dyadic International, Inc, Pursuant to Section 302 of the Sarbanes-Oxley Act of 2002				x
31.2	Certification of Chief Financial Officer of Dyadic International, Inc. Pursuant to Section 302 of the Sarbanes-Oxley Act of 2002				x
32.1^	Certification of Chief Executive Officer of Dyadic International, Inc. Pursuant to Section 906 of the Sarbanes-Oxley Act of 2002				
32.2^	Certification of Chief Financial Officer of Dyadic International, Inc. Pursuant to Section 906 of the Sarbanes-Oxley Act of 2002				
97	Policy Related to Recovery of Erroneously Awarded Compensation				
101.INS	Inline XBRL Instance Document				x
101.SCH	Inline XBRL Taxonomy Extension Schema Document				x
101.CAL	Inline XBRL Taxonomy Extension Calculation Linkbase Document				x
101.DEF	Inline XBRL Taxonomy Extension Definition Linkbase Document				x
101.LAB	Inline XBRL Taxonomy Extension Labels Linkbase Document				x
101.PRE	Inline XBRL Taxonomy Extension Presentation Linkbase Document				x
104	Cover Page Interactive Data File (formatted as Inline XBRL and contained in Exhibit 101)				

Legend:
** Identifies a management contract or compensatory plan or arrangement.
† Certain provisions of this exhibit have been omitted pursuant to Item 601(b)(10)(iv) of Regulation S-K.
# Previously filed with the SEC.
^ Furnished herewith.

Item 16. Form 10-K Summary

Not applicable.

SIGNATURES

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

DYADIC INTERNATIONAL, INC.

March 28, 2024 By: /s/ Mark A. Emalfarb
Mark A. Emalfarb
President and Chief Executive Officer
(Principal Executive Officer)

March 28, 2024 By: /s/ Ping W. Rawson
Ping W. Rawson
Chief Financial Officer
(Principal Financial Officer and Principal Accounting Officer)

POWER OF ATTORNEY

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

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

Signature	Title	Date
/s/ Mark A. Emalfarb Mark A. Emalfarb	Chief Executive Officer, Director (Principal Executive Officer)	March 28, 2024
/s/ Ping W. Rawson Ping W. Rawson	Chief Financial Officer (Principal Financial Officer and Principal Accounting Officer)	March 28, 2024
/s/ Patrick Lucy Patrick Lucy	Chairman, Director	March 28, 2024
/s/ Jack L. Kaye Jack L. Kaye	Director	March 28, 2024
/s/ Seth J. Herbst Seth J. Herbst, MD	Director	March 28, 2024
/s/Arindam Bose Arindam Bose, Ph.D.	Director	March 28, 2024
/s/Barry C. Buckland Barry C. Buckland, Ph.D.	Director	March 28, 2024
/s/ Michael P. Tarnok Michael P. Tarnok	Director	March 28, 2024

Index to Consolidated Financial Statements

Report of Independent Registered Public Accounting Firm

Shareholders and the Board of Directors of Dyadic International, Inc.
Jupiter, Florida

Opinion on the Financial Statements

We have audited the accompanying consolidated balance sheet of Dyadic International, Inc. (the "Company") as of December 31, 2023, the related consolidated statements of operations, stockholders' equity, and cash flows for the year ended December 31, 2023, 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, 2023, and the results of its operations and its cash flows for the year ended December 31, 2023, in conformity with accounting principles generally accepted in the United States of America.

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

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

Critical Audit Matters

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

/s/Crowe LLP

We have served as the Company's auditor since 2023.

Livingston, New Jersey
March 28, 2024

Report of Independent Registered Public Accounting Firm

To the Board of Directors and
Stockholders of Dyadic International, Inc.:

Opinion on the Financial Statements

We have audited the accompanying consolidated balance sheet of Dyadic International, Inc. and Subsidiaries ("Company") as of December 31, 2022, and the related consolidated statements of operations, stockholders' equity, and cash flows for the year 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 the results of its operations and its cash flows for the year ended December 31, 2022, in conformity with accounting principles generally accepted in the United States of America.

Basis for Opinion

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

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

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

/s/Mayer Hoffman McCann P.C.

We have served as the Company's auditor from 2008 through 2023.
St. Petersburg, Florida
March 29, 2023

DYADIC INTERNATIONAL, INC. AND SUBSIDIARIES

CONSOLIDATED BALANCE SHEETS

	December 31,	
	2023	**2022**
Assets		
Current assets:		
Cash and cash equivalents	$ 6,515,028	$ 5,794,272
Short-term investment securities	748,290	6,847,270
Interest receivable	10,083	58,285
Accounts receivable	466,159	330,001
Prepaid expenses and other current assets	327,775	392,236
Total current assets	8,067,335	13,422,064
Non-current assets:		
Operating lease right-of-use asset, net	141,439	—
Investment in Alphazyme	—	284,709
Other assets	10,462	6,045
Total assets	$ 8,219,236	$ 13,712,818
Liabilities and stockholders' equity		
Current liabilities:		
Accounts payable	$ 656,445	$ 1,276,313
Accrued expenses	1,057,164	955,081
Deferred research and development obligations	490,113	40,743
Deferred license revenue, current portion	—	176,471
Operating lease liability, current portion	48,059	—
Total current liabilities	2,251,781	2,448,608
Deferred license revenue, net of current portion	—	176,471
Operating lease liability, net of current portion	88,870	—
Total liabilities	2,340,651	2,625,079
Commitments and contingencies (Note 5)		
Stockholders' equity:		
Preferred stock, $.0001 par value:		
Authorized shares - 5,000,000; none issued and outstanding	—	—
Common stock, $.001 par value:		
Authorized shares - 100,000,000; issued shares - 41,064,563 and 40,816,602, outstanding shares - 28,811,061 and 28,563,100 as of December 31, 2023 and 2022, respectively	41,065	40,817
Additional paid-in capital	105,044,756	103,458,697
Treasury stock, shares held at cost - 12,253,502	(18,929,915)	(18,929,915)
Accumulated deficit	(80,277,321)	(73,481,860)
Total stockholders' equity	5,878,585	11,087,739
Total liabilities and stockholders' equity	$ 8,219,236	$ 13,712,818

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

DYADIC INTERNATIONAL, INC. AND SUBSIDIARIES

CONSOLIDATED STATEMENTS OF OPERATIONS

	Years Ended December 31,	
	2023	**2022**
Revenues:		
Research and development revenue	$ 2,545,865	$ 2,683,244
License revenue	352,941	247,059
Total revenue	2,898,806	2,930,303
Costs and expenses:		
Costs of research and development revenue	1,975,849	2,123,193
Research and development	3,297,266	4,501,365
General and administrative	5,817,013	6,421,505
Foreign currency exchange loss	38,417	49,918
Total costs and expenses	11,128,545	13,095,981
Loss from operations	(8,229,739)	(10,165,678)
Other income:		
Interest income	416,686	180,420
Gain on sale of Alphazyme	1,017,592	—
Other income	—	250,000
Total other income	1,434,278	430,420
Net loss	$ (6,795,461)	$ (9,735,258)
Basic and diluted net loss per common share	$ (0.24)	$ (0.34)
Basic and diluted weighted-average common shares outstanding	28,798,833	28,364,482

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

DYADIC INTERNATIONAL, INC. AND SUBSIDIARIES

CONSOLIDATED STATEMENTS OF STOCKHOLDERS' EQUITY

	Common Stock		Treasury Stock		Additional paid-in capital	Accumulated deficit	Total
	Shares	Amount	Shares	Amount			
Balance at December 31, 2021	40,482,659	$ 40,483	(12,253,502)	$ (18,929,915)	$ 101,026,496	$ (63,746,602)	$ 18,390,462
Stock-based compensation expenses	—	—	—	—	1,888,944	—	1,888,944
Issuance of common stock upon exercise of stock options	333,943	334	—	—	543,257	—	543,591
Net loss	—	—	—	—	—	(9,735,258)	(9,735,258)
Balance at December 31, 2022	40,816,602	$ 40,817	(12,253,502)	$ (18,929,915)	$ 103,458,697	$ (73,481,860)	$ 11,087,739
Stock-based compensation expenses	—	—	—	—	1,244,121	—	1,244,121
Issuance of common stock upon vesting of restricted stock units	247,961	248	—	—	341,938	—	342,186
Net loss	—	—	—	—	—	(6,795,461)	(6,795,461)
Balance at December 31, 2023	41,064,563	$ 41,065	(12,253,502)	$ (18,929,915)	$ 105,044,756	$ (80,277,321)	$ 5,878,585

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

DYADIC INTERNATIONAL, INC. AND SUBSIDIARIES

CONSOLIDATED STATEMENTS OF CASH FLOWS

	Years Ended December 31,	
	2023	**2022**
Cash flows from operating activities		
Net loss	$ (6,795,461)	$ (9,735,258)
Adjustments to reconcile net loss to net cash used in operating activities:		
Stock-based compensation expense	1,244,121	1,888,944
Amortization of held-to-maturity securities, net	(53,032)	33,790
Gain on investment in Alphazyme	(1,017,592)	—
Foreign currency exchange loss	38,418	49,918
Changes in operating assets and liabilities:		
Operating lease assets and liabilities, net	(4,510)	—
Interest receivable	48,202	36,090
Accounts receivable	(141,332)	(83,265)
Prepaid expenses and other current assets	64,902	(13,925)
Accounts payable	(651,168)	(248,128)
Accrued expenses	444,269	245,521
Deferred license revenue	(352,942)	(147,058)
Deferred research and development obligations	449,370	(110,404)
Net cash used in operating activities	**(6,726,755)**	**(8,083,775)**
Cash flows from investing activities		
Purchases of held-to-maturity investment securities	(2,995,988)	(9,869,280)
Proceeds from maturities of investment securities	9,148,000	7,500,000
Proceeds from the sale of investment in Alphazyme	1,297,884	—
Net cash provided by (used in) investing activities	**7,449,896**	**(2,369,280)**
Cash flows from financing activities		
Proceeds from exercise of options	—	543,591
Net cash provided by financing activities	**—**	**543,591**
Effect of exchange rate changes on cash	(2,385)	(44,744)
Net decrease in cash and cash equivalents	**720,756**	**(9,954,208)**
Cash and cash equivalents at beginning of period	5,794,272	15,748,480
Cash and cash equivalents at end of period	$ **6,515,028**	$ **5,794,272**
Supplemental cash flow information		
Vesting of restricted stock units	$ 342,186	$ —
Right-of-use asset obtained in exchange for lease obligations	$ 156,983	$ —

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

Note 1: Organization and Summary of Significant Accounting Policies

Description of Business

Dyadic International, Inc. ("Dyadic", "we", "us", "our", or the "Company") is a global biotechnology company based in Jupiter, Florida with operations in the United States and a satellite office in the Netherlands, and it utilizes third-party consultants and research organizations to carry out the Company's activities. Over the past two plus decades, the Company has developed a gene expression platform for producing commercial quantities of industrial enzymes and other proteins, and has previously licensed this technology to third parties, such as Abengoa Bioenergy SA, BASF SE, Codexis, Inc. and others, for use in industrial (non-pharmaceutical) applications. This technology is based on the *Thermothelomyces heterothallica* (formerly known as *Myceliophthora thermophila*) fungus, which the Company named C1.

Subsequent to the Company selling its industrial technology business to Danisco USA ("Danisco"), the industrial biosciences business of DuPont (NYSE: DD) (the "DuPont Transaction") on December 31, 2015, the Company has been focused on building the C1-cell protein production platform for the development and production of biologic products including enzymes and other proteins for human and animal health. Some examples of human and animal vaccines and drugs which have the potential to be produced from C1-cells are protein antigens, ferritin nanoparticles, virus-like particles ("VLPs"), monoclonal antibodies ("mAbs"), Bi/Tri-specific antibodies, Fab antibody fragments, Fc-fusion proteins, as well as other therapeutic enzymes and proteins. The Company is involved in multiple funded research collaborations with animal and human pharmaceutical companies which are designed to leverage its C1-cell protein production platform to develop innovative vaccines and drugs, biosimilars and/or biobetters.

The Company also developed the Dapibus™ thermophilic filamentous fungal based microbial protein production platform to enable the rapid development and large-scale manufacture of low-cost proteins, metabolites, and other biologic products for use in non-pharmaceutical applications, such as food, nutrition, and wellness.

Liquidity and Capital Resources

The Company expects to incur losses and have negative net cash flows from operating activities as it continues developing its microbial platforms and related products, and as it expands its pipelines and engages in further research and development activities for internal products as well as for its third-party collaborators and licensees. The success of the Company depends on its ability to develop its technologies and products to the point of regulatory approval and subsequent revenue generation or through the sublicensing of the Company's technologies and products, to raise capital to finance these developmental efforts.

For the year ended December 31, 2023, the Company received $1.3 million from the sale of its equity interest in Alphazyme, LLC, and $600,000 upfront payment from a product development and licensing agreement.

On March 8, 2024, the Company sold and issued an aggregate principal amount of $6.0 million of its 8.0% Senior Secured Convertible Promissory Notes due March 8, 2027 (the "Convertible Notes") in a private placement in reliance on the exemption from registration provided by Section 4(a)(2) of the Securities Act of 1933, as amended (the "Securities Act"). The purchasers of the Convertible Notes include immediate family members and family trusts related to Mark Emalfarb, our President and Chief Executive Officer and a member of our Board of Directors, including The Francisco Trust, an existing holder of more than 5% of the Company's outstanding common stock, (collectively, the "Purchasers").

The Convertible Notes will be senior, secured obligations of Dyadic and its affiliates, and interest will be payable quarterly in cash on the principal amount equal to 8% per annum. The Convertible Notes will mature on March 8, 2027 (the "Maturity Date"), unless earlier converted, repurchased, or redeemed in accordance with the terms of the Convertible Notes.

The Convertible Notes can be converted into shares of Dyadic's Class A common stock (the "Common Stock"), at the option of the holders of the Convertible Notes (the "Noteholders") at any time prior to the Maturity Date. The conversion price is $1.79 per share of the Common Stock, which is equal to 125% of the trailing 30-day VWAP of the Common Stock ending on the trading day immediately preceding the date of the securities purchase agreement.

This private placement funding strengthened our financial position, and it will support our new-term revenue growth and accelerate our strategic objective of commercialization opportunities for pharmaceutical and non-pharmaceutical applications. The Company has received successful top-line results for the Phase 1 clinical trial of DYAI-100, and we do not plan to continue Phase 2/3 clinical trials unless third-party funding is secured.

The Company expects its existing cash and cash equivalents and cash raised from the Convertible Notes, investments in debt securities, and operating cash flows will be sufficient to meet its operational, business, and other liquidity requirements for at least the next twelve (12) months from the date of issuance of the financial statements contained in this Form 10-K. However, the Company has based this estimate on assumptions that may prove to be wrong, and its operating plan may change as a result of many factors currently unknown to it. In the event our financing needs are not able to be met by our existing cash, cash equivalents and investments, we would seek to raise additional capital through strategic financial opportunities that could include, but are not limited to, future public or private equity offerings, collaboration agreements, and/or other means. Any amounts raised may be used for the further development and commercialization of product candidates, and for other working capital purposes. There is no guarantee that any of these strategic or financing opportunities will be executed or realized on favorable terms, if at all, and some could be dilutive to existing shareholders.

Basis of Presentation

The accompanying audited consolidated financial statements include the accounts of the Company and its wholly owned subsidiaries. Dyadic consolidates entities in which we have a controlling financial interest. We consolidate subsidiaries in which we hold and/or control, directly or indirectly, more than 50% of the voting rights. All significant intra-entity transactions and balances have been eliminated in consolidation. These consolidated financial statements have been prepared in conformity with U.S. generally accepted accounting principles ("GAAP").

The Company conducts business in one operating segment, which is identified by the Company based on how resources are allocated, and operating decisions are made. Management evaluates performance and allocates resources based on the Company as a whole.

Use of Estimates

The preparation of these consolidated financial statements in accordance with GAAP requires management to make estimates and judgments that affect the reported amount of assets and liabilities and related disclosure of contingent assets and liabilities at the date of our consolidated financial statements and the reported amounts of revenues and expenses during the applicable period. Estimates inherent in the preparation of these consolidated financial statements include, but are not limited to, estimates related to revenue recognition, accrued expenses, stock-based compensation expense, and income taxes. The Company bases its estimates on historical experience and other market specific or other relevant assumptions it believes to be reasonable under the circumstances. On an ongoing basis, management evaluates its estimates as there are changes in circumstances, facts and experience. Actual results may differ from these estimates under different assumptions or conditions. Such differences could be material to the consolidated financial statements.

Concentrations and Credit Risk

The Company's financial instruments that are potentially subject to concentrations of credit risk consist primarily of cash and cash equivalents, investment securities, and accounts receivable. At times, the Company has cash, cash equivalents, and investment securities at financial institutions exceeding the Federal Depository Insurance Company ("FDIC") and the Securities Investor Protection Corporation ("SIPC") insured limit on domestic currency and the Netherlands FDIC counterpart for foreign currency. The Company only deals with reputable financial institutions and has not experienced any losses in such accounts.

For the years ended December 31, 2023 and 2022, the Company's revenue was generated from sixteen and fourteen customers, respectively. As of December 31, 2023 and 2022, the Company's accounts receivable was from thirteen and six customers, respectively. Significant customers are those that account for greater than 10% of the Company's revenues. For the years ended December 31, 2023 and 2022, two and three significant customers accounted for approximately $1,150,000 or 45.2% and $1,811,000 or 67.5% of research and development revenue, respectively. The loss of business from one or a combination of the Company's customers could adversely affect its operations.

The Company conducts operations in the Netherlands through its foreign subsidiary and generates a portion of its revenues from customers that are located outside of the United States. For the years ended December 31, 2023 and 2022, the Company had six customers outside of the United Sates (i.e. European and Asian customers) that accounted for approximately $537,000 or 21.1% and $586,000 or 21.8% of total revenue, respectively. As of December 31, 2023 and 2022, the Company had six and four customers outside of the United Sates (i.e. European and Asian customers) that accounted for approximately $213,000 or 45.6% and $91,000 or 27.4% of accounts receivable, respectively.

The Company uses contract research organizations ("CROs") to conduct its research projects and manage its clinical trial. For each of the years ended December 31, 2023 and 2022, three CROs accounted for approximately $4,644,000 or 96.0% and $5,575,000 or 97.9% of total research services we purchased, respectively. As of December 31, 2023, three CROs accounted for approximately $620,000 or 94.4% of accounts payable. As of December 31, 2022, three CROs accounted for approximately $1,018,000 or 79.7% of accounts payable. The loss of business from any CRO or a combination of the Company's CROs could adversely affect its operations.

Cash and Cash Equivalents

We treat highly liquid investments with original maturities of three months or less when purchased as cash equivalents, including money market funds, which are unrestricted for withdrawal or use.

Investment Securities

The Company's investment policy requires investment securities to be investment grade and held to maturity with the primary objective to maintain a high degree of liquidity while maximizing yield. The Company invests excess cash balances in short-term and long-term investment grade securities. Short-term investment securities mature within twelve (12) months or less, and long-term investment securities mature over twelve (12) months from the applicable reporting date. Management determines the appropriate classification of each investment at the time of purchase and reevaluates the classifications at each balance sheet date.

The Company classifies its investments in debt securities as held-to-maturity. Held-to-maturity securities are those securities that the Company has the ability and intent to hold until maturity. Held-to-maturity securities are recorded at amortized cost, net of allowance for credit losses if applicable, and adjusted for the amortization or accretion of premiums or discounts. Premiums and discounts are amortized over the life of the related held-to-maturity security. When a debt security is purchased at a premium, both the face value of the debt and premium amount are reflected as investing outflow.

When evaluating an investment for other-than-temporary impairment, the Company reviews factors such as the length of time and extent to which fair value has been below its cost basis, the financial condition of the issuer and any changes thereto, changes in market interest rates, and whether it is more likely than not the Company will be required to sell the investment before recovery of the investment's cost basis. The Company measures expected credit losses on held to maturity debt securities on an individual security basis. The estimate of expected credit losses considers historical credit information from external sources. The impairment of the investment that is related to the credit loss, if any, is expensed in the period in which the event or change occurred.

As of December 31, 2023 and 2022, all of our money market funds were invested in U.S. Government money market funds. The Company did not have any investment securities classified as trading as of December 31, 2023 and 2022.

Accounts Receivable

Accounts receivable consist of billed receivables currently due from customers and unbilled receivables. Unbilled receivables represent the excess of contract revenue (or amounts reimbursable under contracts) over billings to date. Such amounts become billable in accordance with the contract terms, which usually consider the passage of time, achievement of certain milestones or completion of the project.

Accounts receivable are stated net of an allowance for credit losses, if deemed necessary based on the Company's evaluation of collectability and potential credit losses. Management assesses the collectability of its accounts receivable using the specific identification of account balances and considers the credit quality and financial condition of its significant customers, historical information regarding credit losses and the Company's evaluation of current and expected future economic conditions and changes in our customer collection trends. If necessary, an allowance for credit losses is recorded against accounts receivable such that the carrying value of accounts receivable reflects the net amount expected to be collected. Accounts receivable balances are written off against the allowance for credit losses when the potential for collectability is considered remote. Substantially all of our accounts receivable were current and include unbilled amounts that will be billed and collected over the next twelve (12) months. Management determined that no allowance for credit losses was required as of December 31, 2023 and 2022.

Accounts receivable consist of the following:

	December 31,	
	2023	2022
Billed receivable	$ 410,617	$ 115,469
Unbilled receivable	55,542	214,532
	$ 466,159	$ 330,001

Prepaid Expenses and Other Current Assets

Prepaid expenses and other current assets consist of the following:

	December 31,	
	2023	2022
Prepaid insurance	$ 209,888	$ 265,429
Prepaid expenses - various	117,887	124,273
Prepaid taxes	—	2,534
	$ 327,775	$ 392,236

Accounts Payable

Accounts payable consist of the following:

	December 31,	
	2023	2022
Research and development expenses	$ 575,436	$ 1,067,958
Legal expenses	1,957	56,514
Other	79,052	151,841
	$ 656,445	$ 1,276,313

Accrued Expenses

Accrued expenses consist of the following:

	December 31,	
	2023	2022
Employee wages and benefits	$ 561,720	$ 580,264
Research and development expenses	274,080	343,457
Legal expenses	210,004	—
Other	11,360	31,360
	$ 1,057,164	$ 955,081

Revenue Recognition

The Company has no products approved for sale. All our revenue to date has been research revenue from third-party collaborations and government grants, as well as revenue from sublicensing agreements and collaborative arrangements, which may include upfront payments, options to obtain a license, payment for research and development services, milestone payments and royalties, in the form of cash or non-cash considerations (e.g., minority equity interest).

Revenue related to research collaborations and agreements: The Company typically performs research and development services as specified in each respective agreement on a best-efforts basis, and recognizes revenue from research funding under collaboration agreements in accordance with the 5-step process outlined in ASC Topic 606 ("Topic 606"): (i) identify the contract(s) with a customer; (ii) identify the performance obligations in the contract; (iii) determine the transaction price; (iv) allocate the transaction price to the performance obligations in the contract; and (v) recognize revenue when (or as) the entity satisfies a performance obligation. We recognize revenue when we satisfy a performance obligation by transferring control of the service to a customer in an amount that reflects the consideration that we expect to receive. Depending on how the performance obligation under our license and collaboration agreements is satisfied, we recognize the revenue either at a point in time or over time by using the input method under Topic 606 to measure the progress toward complete satisfaction of a performance obligation.

Under the input method, revenue will be recognized based on the entity's efforts or inputs to the satisfaction of a performance obligation (e.g., resources consumed, labor hours expended, costs incurred, or time elapsed) relative to the total expected inputs to the satisfaction of that performance obligation. The Company believes that the cost-based input method is the best measure of progress to reflect how the Company transfers its performance obligation to a customer. In applying the cost-based input method of revenue recognition, the Company uses actual costs incurred relative to budgeted costs to fulfill the performance obligation. These costs consist primarily of full-time equivalent effort and third-party contract costs. Revenue will be recognized based on actual costs incurred as a percentage of total budgeted costs as the Company completes its performance obligations.

A cost-based input method of revenue recognition requires management to make estimates of costs to complete the Company's performance obligations. In making such estimates, significant judgment is required to evaluate assumptions related to cost estimates. The cumulative effect of revisions to estimated costs to complete the Company's performance obligations will be recorded in the period in which changes are identified and amounts can be reasonably estimated. A significant change in these assumptions and estimates could have a material impact on the timing and amount of revenue recognized in future periods.

Revenue related to grants: The Company may receive grants from governments, agencies, and other private and not-for-profit organizations. These grants are intended to be used to partially or fully fund the Company's research collaborations. However, most, if not all, of such potential grant revenues, if received, is expected to be earmarked for third parties to advance the research required, including preclinical and clinical trials for SARS-CoV-2 vaccines and/or antibodies candidates.

Revenue related to sublicensing agreements: If the sublicense to the Company's intellectual property is determined to be distinct from the other performance obligations identified in the arrangement, the Company recognizes revenue allocated to the license when technology is transferred to the customer and the customer can use and benefit from the license.

Customer options: If the sublicensing agreement includes customer options to purchase additional goods or services, the Company will evaluate if such options are considered material rights to be deemed as separate performance obligations at the inception of each arrangement.

Milestone payments: At the inception of each arrangement that includes development, commercialization, and regulatory milestone payments, the Company evaluates whether the achievement of the milestones is considered probable and estimates the amount to be included in the transaction price. If the milestone payment is in exchange for a sublicense and is based on the sublicensee's subsequent sale of product, the Company recognizes milestone payment by applying the accounting guidance for royalties. To date, the Company has not recognized any milestone payment revenue resulting from any of its sublicensing arrangements.

Royalties: With respect to licenses deemed to be the predominant item to which the sales-based royalties relate, including milestone payments based on the level of sales, the Company recognizes revenue at the later of (i) when the related sales occur or (ii) when the performance obligation to which some or all the royalty has been allocated has been satisfied (or partially satisfied). To date, the Company has not recognized any royalty revenue resulting from any of its sublicensing arrangements.

We invoice customers based on our contractual arrangements with each customer, which may not be consistent with the period that revenues are recognized. When there is a timing difference between when we invoice customers and when revenues are recognized, we record either a contract asset (unbilled accounts receivable) or a contract liability (deferred research and development obligations), as appropriate. If upfront fees or considerations related to sublicensing agreement are received prior to the technology transfer, the Company will record the amount received as deferred revenue from licensing agreement.

We are not required to disclose the value of unsatisfied performance obligations for (i) contracts with an original expected length of one year or less and (ii) contracts for which we recognize revenue at the amount to which we have the right to invoice for services performed.

The Company adopted a practical expedient to expense sales commissions when incurred because the amortization period would be one year or less.

Leases

The Company determines if an arrangement is, or contains, a lease at contract inception and during modifications or renewal of existing leases. The Company does not recognize leases with terms of twelve months or less on the balance sheet. Options to extend or terminate a lease are not included in the Company's initial lease term assessment, unless there is reasonable certainty that the Company will exercise any such option. Leases are classified as either finance leases or operating leases based on criteria in Accounting Standards Codification ("ASC") 842.

For operating leases, right-of-use assets and liabilities are recognized at lease commencement date based on the present value of lease payments over the lease term. In determining the net present value of lease payments, the Company uses an estimated rate of interest that they would have to pay to borrow equivalent funds on a collateralized basis at the lease commencement date. The operating lease right-of-use asset also includes any lease payments made and excludes any lease incentives. Lease expense is recognized on a straight-line basis over the expected lease term.

The Company's prior lease for its corporate headquarters located at 140 Intracoastal Pointe Dr. expired on August 31, 2023, and there was no right-of-use asset or lease liability recognized for this lease due to its short-term nature. In August 2023, the Company entered into a new lease ("1044 N Lease") comprising approximately 1,719 square feet of office space located at 1044 N US 1, Jupiter, Florida, commencing September 1, 2023 ("Commencement Date") and will expire on August 31, 2026. Rent is subject to three percent (3%) annual increases, and the Company is responsible for certain common area maintenance charges and taxes throughout the life of the 1044 N Lease. The 1044 N Lease has an initial term of three (3) years, following the Commencement Date with an option to extend for two (2) successive one (1) year terms. The options were not included in the lease term used in determining the right-of-use asset or lease liability as the Company did not consider it reasonably certain they would exercise the options.

For the years ended December 31, 2023 and 2022, the Company's total operating lease expense was approximately $72,000 and $58,000, respectively. As of December 31, 2023, the Company's total operating lease liabilities was approximately $136,929, which is presented net of imputed interest of $16,770, and the operating lease right-of-use asset was approximately $141,439. There were no operating lease liabilities or operating lease right-of-use assets as of December 31, 2022.

As of December 31, 2023, the weighted average remaining lease term was 2.7 years, and the weighted average discount rate was 8.8%.

Research and Development Costs

Research and development ("R&D") costs are expensed as incurred. R&D costs are related to the Company's internally funded pharmaceutical programs and other governmental and commercial projects.

Research and development costs consist of personnel-related costs, facilities, research-related overhead, services from independent contract research organizations, and other external costs. Research and development costs, during the years ended December 31, 2023 and 2022 were as follows:

	Years Ended December 31,	
	2023	**2022**
Outside contracted services	$ 2,677,941	$ 3,707,269
Personnel related costs	553,741	743,051
Facilities, overhead and other	65,584	51,045
	$ 3,297,266	$ 4,501,365

Foreign Currency Transaction Gain or Loss

The Company and its foreign subsidiary use the U.S. dollar as its functional currency, and initially measure the foreign currency denominated assets and liabilities at the transaction date. Monetary assets and liabilities are then re-measured at exchange rates in effect at the end of each period, and property and non-monetary assets and liabilities are converted at historical rates.

Fair Value Measurements

The Company applies fair value accounting for certain financial instruments that are recognized or disclosed at fair value in the financial statements. The Company defines fair value as the price that would be received from selling an asset or paid to transfer a liability in an orderly transaction between market participants at the measurement date. Fair value is estimated by applying the following hierarchy, which prioritizes the inputs used to measure fair value into three levels and bases the categorization within the hierarchy upon the lowest level of input that is available and significant to the fair value measurement:

- Level 1 – Quoted prices in active markets for identical assets or liabilities.
- Level 2 – Observable inputs other than quoted prices in active markets for identical assets and liabilities, quoted prices for identical or similar assets or liabilities in inactive markets, or other inputs that are observable or can be corroborated by observable market data for substantially the full term of the assets or liabilities.
- Level 3 – Inputs that are generally unobservable and typically reflect management's estimate of assumptions that market participants would use in pricing the asset or liability.

The Company's financial instruments included cash and cash equivalents, investment in debt securities, accounts receivable, accounts payable and accrued expenses, accrued payroll and related liabilities, deferred research and development obligations and deposits. The carrying amount of these financial instruments, except for investment in debt securities, approximates fair value due to the short-term maturities of these instruments. The Company's short-term and long-term investments in debt securities are recorded at amortized cost, and their estimated fair value amounts are provided by the third-party broker service for disclosure purposes.

Income Taxes

The Company accounts for income taxes under the asset and liability method in accordance with ASC Topic 740, "Income Taxes". Under this method, income tax expense /(benefit) is recognized for: (i) taxes payable or refundable for the current year and (ii) deferred tax consequences of temporary differences resulting from matters that have been recognized in an entity's financial statements or tax returns. Deferred tax assets and liabilities are measured using enacted tax rates expected to apply to taxable income in the years in which those temporary differences are expected to be recovered or settled. The effect on deferred tax assets and liabilities of a change in tax rates is recognized in the results of operations in the period that includes the enactment date. A valuation allowance is provided to reduce the deferred tax assets reported if based on the weight of the available positive and negative evidence, it is more likely than not some portion or all the deferred tax assets will not be realized.

In determining taxable income for the Company's consolidated financial statements, we are required to estimate income taxes in each of the jurisdictions in which we operate. This process requires the Company to make certain estimates of our actual current tax exposure and assessment of temporary differences between the tax and financial statement recognition of revenue and expense. In evaluating the Company's ability to recover its deferred tax assets, the Company must consider all available positive and negative evidence including its past operating results, the existence of cumulative losses in the most recent years and its forecast of future taxable income. Significant management judgment is required in determining our provision for income taxes, deferred tax assets and liabilities and any valuation allowance recorded against our net deferred tax assets.

The Company is required to evaluate the provisions of ASC 740 related to the accounting for uncertainty in income taxes recognized in a company's financial statements. ASC 740 prescribes a comprehensive model for how a company should recognize, present, and disclose uncertain positions that the company has taken or expects to take in its tax return. For those benefits to be recognized, a tax position must be more-likely-than-not to be sustained upon examination by taxing authorities. Differences between tax positions taken or expected to be taken in a tax return and the net benefit recognized and measured pursuant to the interpretation are referred to as "unrecognized benefits." A liability should be recognized (or amount of net operating loss carry forward or amount of tax refundable is reduced) for unrecognized tax benefits, because it represents a company's potential future obligation to the taxing authority for a tax position that was not recognized as a result of applying the provision of ASC 740.

Other Income

For the year ended December 31, 2023, other income of approximately $1,018,000 was related to the sale of the equity interest in Alphazyme, LLC. For the year ended December 31, 2022, other income of $250,000 was related to a settlement payment we received from the termination of term sheet of a proposed license and collaboration.

Comprehensive Income (Loss)

Comprehensive income (loss) includes net income (loss) and other revenue, expenses, gains and losses that are recorded as an element of shareholders' equity but are excluded from net income (loss) under U.S. GAAP. The Company does not have any significant transactions that are required to be reported in other comprehensive income (loss), and therefore, does not separately present a statement of comprehensive income (loss) in its consolidated financial statements.

Stock-Based Compensation

We recognize all share-based payments to employees, consultants, and our Board of Directors (the "Board"), as non-cash compensation expense, in research and development expenses or general and administrative expenses in the consolidated statement of operations based on the grant date fair values of such payments. Stock-based compensation expense recognized each period is based on the value of the portion of share-based payment awards that is ultimately expected to vest during the period. Forfeitures are recorded as they occur.

For performance-based awards, the Company recognizes related stock-based compensation expense based upon its determination of the potential likelihood of achievement of the specified performance conditions at each reporting date.

Net Loss Per Share

Basic net loss per share is computed by dividing net loss available to common shareholders by the weighted average number of common shares outstanding during the reporting period. Diluted net loss per share adjusts the weighted average number of common stock outstanding for the potential dilution that could occur if common stock equivalents, such as stock options, warrants, restricted stock, restricted stock units and convertible debt, were exercised and converted into common stock, calculated by applying the treasury stock method.

For the years ended December 31, 2023 and 2022, the effect of the potential exercise of options to purchase 5,469,247 and 5,031,097 shares of common stock, respectively, were excluded from the computation of diluted net loss per share as their effect would have been anti-dilutive.

Recently Adopted Accounting Pronouncements

In June 2016, the Financial Accounting Standards Board (the "FASB") issued Accounting Standards Update (the "ASU") 2016-13, *Financial Instruments—Credit Losses (Topic 326)*: *Measurement of Credit Losses on Financial Instruments*. which replaces the incurred loss model with a forward-looking expected credit loss ("CECL") model and requires consideration of a broader range of reasonable and supportable information to estimate expected credit losses. ASU 2016-13 applies to financial assets, measured at amortized cost, including held-to-maturity debt securities and accounts receivable. ASU 2016-13 must be adopted using a modified retrospective transition method through a cumulative-effect adjustment to members' equity in the period of adoption. The Company adopted ASU 2016-13 and related amendments as of January 1, 2023, and the adoption of the new standard did not have a material impact on the Company's consolidated financial statements.

Recent Accounting Pronouncements Not Adopted as of December 31, 2023

In December 2023, the FASB issued Accounting Standards Update 2023-09 – Income Taxes (Topic ASC 740) Income Taxes. The ASU improves the transparency of income tax disclosures by requiring (1) consistent categories and greater disaggregation of information in the rate reconciliation and (2) income taxes paid disaggregated by jurisdiction. It also includes certain other amendments to improve the effectiveness of income tax disclosures. The amendments in ASU 2023-09 will become effective beginning with our 2025 fiscal year. Early adoption is permitted for annual financial statements that have not yet been issued or made available for issuance. We do not expect that this guidance will have a material impact on our financial position and results of operations.

In November 2023, the FASB issued Accounting Standards Update 2023-07 – Segment Reporting (Topic ASC 280) Improvements to Reportable Segment Disclosures. The ASU improves reportable segment disclosure requirements, primarily through enhanced disclosure about significant segment expenses. The enhancements under this update require disclosure of significant segment expenses that are regularly provided to the Chief Operating Decision Maker ("CODM") and included within each reported measure of segment profit or loss, require disclosure of *other segment items* by reportable segment and a description of the composition of *other segment items*, require annual disclosures under ASC 280 to be provided in interim periods, clarify use of more than one measure of segment profit or loss by the CODM, require that the title of the CODM be disclosed with an explanation of how the CODM uses the reported measures of segment profit or loss to make decisions, and require that entities with a single reportable segment provide all disclosures required by this update and required under ASC 280. ASU 2023-07 is effective for public business entities for fiscal years beginning after December 15, 2023, with early adoption permitted. We continue to evaluate these changes and do not expect that this guidance will have a material impact on our financial position, results of operations, or financial statement disclosures.

Note 2: Cash, Cash Equivalent, and Investments

The Company's investments in debt securities are classified as held-to-maturity and are recorded at amortized cost, net of allowance for credit losses, and its investments in money market funds are classified as available-for-sale securities and presented as cash equivalents on the consolidated balance sheets. The following table shows the Company's cash, available-for-sale securities, and investment securities by major security type as of December 31, 2023 and 2022:

	December 31, 2023				
	Level (1)	Fair Value	Gross Unrealized Holding Gains	Gross Unrealized Holding Losses	Adjusted Cost
Cash and Cash Equivalents					
Cash		$ 25,775	$ —	$ —	$ 25,775
Money Market Funds	1	6,489,253	—	—	6,489,253
Subtotal		6,515,028	—	—	6,515,028
Short-Term Investment Securities (2)					
Corporate Bonds (3)	2	748,105	—	(185)	748,290
Total		$ 7,263,133	$ —	$ (185)	$ 7,263,318

	December 31, 2022				
	Level (1)	Fair Value	Gross Unrealized Holding Gains	Gross Unrealized Holding Losses	Adjusted Cost
Cash and Cash Equivalents					
Cash		$ 26,782	$ —	$ —	$ 26,782
Money Market Funds	1	5,767,490	—	—	5,767,490
Subtotal		5,794,272	—	—	5,794,272
Short-Term Investment Securities (2)					
Corporate Bonds (3)	2	6,800,062	—	(47,208)	6,847,270
Total		$ 12,594,334	$ —	$ (47,208)	$ 12,641,542

Notes:

(1) Definition of the three-level fair value hierarchy:

- Level 1 - Quoted prices (unadjusted) in active markets for identical assets or liabilities
- Level 2 - Other inputs that are directly or indirectly observable in the markets
- Level 3 - Inputs that are generally unobservable

(2) Short-term investment securities will mature within 12 months or less, from the applicable reporting date.

(3) For the years ended December 31, 2023 and 2022, the Company received discounts of $39,012 and $6,280 to purchase held-to-maturity investment securities, respectively.

The Company considers declines in market value of its investment portfolio to be temporary in nature. The Company's investment policy requires investment securities to be investment grade and held to maturity with the primary objective to maintain a high degree of liquidity while maximizing yield. When evaluating an investment for other-than-temporary impairment, the Company reviews factors such as the length of time and extent to which fair value has been below its cost basis, the financial condition of the issuer and any changes thereto, changes in market interest rates, and whether it is more likely than not the Company will be required to sell the investment before recovery of the investment's cost basis. As of December 31, 2023, the Company does not consider any of its investments to be other-than-temporarily impaired.

Note 3: Research and Collaboration Agreements, Sublicense Agreements, and Investments in Privately Held Companies

Inzymes ApS

On September 18, 2023, Dyadic International (USA) Inc., a subsidiary of the Company, signed a Development and Exclusive License Agreement (the "Inzymes Agreement") with Inzymes ApS ("Inzymes"), a Denmark corporation, to develop and commercialize certain non-animal dairy enzymes used in the production of food products using Dyadic's proprietary Dapibus™ platform.

Under the terms of the Inzymes Agreement, a research collaboration to develop a basket of dairy enzymes will be fully funded by Inzymes with an upfront payment of $0.6 million and an additional payment payable upon the first commercial sale of product. Dyadic will also be eligible to receive success fees upon the achievement of certain target yields, milestone payments upon the first commercial sale of each product and royalties.

In October 2023, the Company received the upfront payment of $0.6 million in accordance with the terms of the Inzymes Agreement. The payment consisted of funding for specified product research and development efforts and right of first refusal for certain product candidates. For the year ended December 31, 2023, the Company recorded research and development revenues of approximately $110,000, in connection with the Inzymes Agreement.

A Global Food Ingredient Company

On May 10, 2022, the Company entered into a Joint Development Agreement (the "JDA") with a Global Food Ingredient Company ("GFIC") to develop and manufacture several animal free ingredient products using the Company's biotechnologies.

Under the initial terms of the JDA, Dyadic was to develop its proprietary production cell lines for the manufacture of animal free ingredient product candidates. As of December 31, 2023, the GFIC has completed its one-year funding commitment for the initial phase of research collaboration in an amount approximating $1.35 million, and, pursuant to the GFIC's rights under the JDA, the Company and the GFIC are conferring to decide whether or not, and if it is possible, to move forward to the next phase of the project. The Company is also considering other funding sources to continue the project.

For the years ended December 31, 2023 and 2022, the Company recorded research and development revenues, including milestone payments, of approximately $631,000 and $790,000, respectively, in connection with the JDA.

Phibro/Abic

On February 10, 2022, the Company entered into an exclusive sub-license agreement with Abic Biological Laboratories Ltd. ("Abic"), an affiliate of Phibro Animal Health Corporation ("Phibro") to provide services for a targeted disease (the "Phibro/Abic Agreement"). The Phibro/Abic Agreement was an addendum to the initially non-exclusive sub-license agreement the Company signed with Phibro on July 1, 2020. According to the Phibro/Abic Agreement, the Company received an exclusivity payment in April 2022. Since then, the Company has expanded the license agreement to include additional research projects to develop animal vaccines for livestock.

Under the Phibro/Abic Agreement, the Company has received an exclusivity payment in April 2022 and is eligible to receive certain milestone payment upon regulatory approval, and future sales-based royalty payments. The milestone payment is considered constrained variable consideration and excluded from the transaction price at inception. The Company will re-evaluate the transaction price in each reporting period and as uncertain events are resolved or other changes in circumstances occur. The Company will not recognize revenue related to sales-based royalty until the associated event occurs.

As of December 31, 2023, there were no events or circumstances that would change the transaction price and no milestone or royalty payments have been recognized.

Janssen

On December 16, 2021, the Company entered a Research, License, and Collaboration Agreement (the "Janssen Agreement") for the manufacture of therapeutic protein candidates using its C1-cell protein production platform with Janssen Biotech, Inc., one of the Janssen Pharmaceutical Companies of Johnson & Johnson ("Janssen").

On October 2, 2023, Janssen provided written notice to Dyadic that it has decided to wind down the collaboration with an effective end date of December 31, 2023.

For the years ended December 31, 2023 and 2022, the Company recognized approximately $353,000 and $176,000 license revenue and research and development revenues of approximately $520,000 and $539,000, respectively, in connection with the Janssen Agreement. As of December 31, 2023 and 2022, approximately $145,000 and $121,000 of accounts receivable were related to Janssen, respectively.

Alphazyme

In 2019 the Company entered into a sub-licensing agreement with Alphazyme, LLC ("Alphazyme") that was subsequently amended (the "Amended Alphazyme LLC Agreement"). Under the Amended Alphazyme LLC Agreement, Alphazyme obtained additional capital contribution and Dyadic's ownership was diluted to 1.99%.

The Company evaluated the nature of its equity interest investment in Alphazyme and determined that Alphazyme is a VIE due to the capital structure of the entity. However, the Company is not the primary beneficiary of Alphazyme as Dyadic does not have the power to control or direct the activities of Alphazyme that most significantly impact the VIE. As a result, the Company does not consolidate its investment in Alphazyme. The Company reports its investment in Alphazyme under the cost method of accounting, given that it does not have the ability to exercise significant influence or control over Alphazyme.

On January 18, 2023, the Company entered into a Securities Purchase Agreement, under which the Company agreed to sell its equity interest in Alphazyme, LLC (the "Alphazyme Sale Agreement"). The Company continues to have the potential to receive additional payments based on the future sales of Alphazyme's existing products, pursuant to the Alphazyme Sale Agreement.

The Amended Sublicense Agreement between Dyadic and Alphazyme, which was previously entered on June 24, 2020, remains in effect. Under the Amended Alphazyme Sub-License Agreement, Dyadic is entitled to potential milestone and royalty payments upon the commercialization of Alphazyme products using Dyadic's proprietary C1-cell protein production platform.

For the year ended December 31, 2023, the Company received a total cash payment of approximately $1.3 million from the sale of its equity interest in Alphazyme, LLC.

Note 4: Income Taxes

For the year ended December 31, 2023, there was no provision for income taxes or unrecognized tax benefits recorded.

The significant components of gain (loss) before income taxes are as follows:

	Years Ended December 31,	
	2023	2022
U.S. operations	$ (6,766,409)	$ (9,828,427)
Foreign operations	(29,052)	93,169
Total loss before provision for income taxes	$ (6,795,461)	$ (9,735,258)

The Company has no current or deferred income tax for the years ended December 31, 2023 and 2022.

The income tax provision differs from the expense amount that would result from applying the federal statutory rates to income before income taxes due to permanent differences, state income taxes and a change in the deferred tax valuation allowance.

The reconciliation between the statutory tax rate and the Company's actual effective tax rate is as follows:

	Years Ended December 31,	
	2023	2022
Tax at U.S. statutory rate	(21.00)%	(21.00)%
State taxes, net of federal benefit	(4.19)	(4.35)
Non-deductible items	0.76	—
Change in valuation allowance	14.54	24.77
True-up adjustment	10.00	0.34
Foreign operations	(0.11)	0.24
Change in tax rate	—	—
Other	—	—
Effective income tax rate	—%	—%

The significant components of the Company's net deferred income tax assets are as follows:

	December 31,	
	2023	2022
Section 174 - R&D expenses	$ 1,769,000	$ 1,046,400
Stock option expense	1,419,300	1,341,900
NOL carryforward	11,620,700	11,524,900
Research and development credits	1,503,600	1,623,100
Operating lease liability	34,700	—
Right-of-use asset	(35,800)	—
Other	134,800	(78,200)
Deferred tax asset, net of deferred tax liabilities	16,446,300	15,458,100
Valuation allowance	(16,446,300)	(15,458,100)
Net deferred tax asset	$ —	$ —

Deferred income taxes reflect the net tax effects of temporary differences between the carrying amounts of assets and liabilities for financial reporting purposes and the amounts used for income tax purposes. In assessing the realizability of deferred tax assets, Management evaluates whether it is more likely than not that some portion or all of the deferred tax assets will not be realized. The ultimate realization of deferred tax assets is dependent upon the generation of future taxable income during the periods in which those temporary differences become deductible. Management considers the scheduled reversal of deferred tax liabilities, projected future taxable income and tax planning strategies in making this assessment. Based on Management's evaluation, the net deferred tax asset, was offset by a full valuation allowance as of December 31, 2023 and 2022.

The Company had federal and state net operating loss ("NOL") carryforwards available as of December 31, 2023, and 2022, in the amount of approximately $45.9 million and $44.0 million, respectively. Approximately $42.9 million of the federal net operating loss carryforwards will be carried forward indefinitely and will be available to offset 80% of taxable income. The remaining amount of the net operating loss carryforwards will expire at varying dates through 2037. In addition, the Company had foreign net operating loss carryforwards available as of December 31, 2023, and 2022, in the amounts of approximately $1.4 million and $1.4 million. These foreign net operating loss carryforwards will begin to expire, if unused, in various amounts between 2025 and 2027.

The Tax Cuts and Jobs Act eliminated the current year deduction election for research and experimental expenditures. Instead, a taxpayer must charge such expenditures to a capital account and is allowed to amortize such expenditures ratably over a five-year period (or fifteen-year period for expenditures attributable to foreign research), beginning with the midpoint of the tax year in which such expenditures are paid or incurred.

Note 5: Commitments and Contingencies

Leases

Jupiter Florida Headquarters

In August 2023, the Company entered into a new lease comprising approximately 1,719 square feet of office space located at 1044 N US 1, Jupiter, Florida, commencing September 1, 2023, and will expire on August 31, 2026. The Company occupies this space for an annual rental rate of approximately $59,000.

The Netherlands Office

The Company maintains a small satellite office in Wageningen, The Netherlands. The Company occupies a flexible office space for an annual rental rate of approximately $4,800. The lease expires on January 31, 2025, and thereafter, the Company will reconsider the leased space to align with the future operations of the Company.

As of December 31, 2023, the future minimum annual lease payments under the operating leases are below. There are no future minimum annual lease payments after 2026.

2024	$	53,361
2025		59,901
2026		35,638
Total	$	148,900

Purchase Obligations

Purchase obligations are primarily related to our contracts with the Company's contract research organizations to provide certain research services. The contracts set forth the Company's minimum purchase requirements that are subject to adjustments based on certain performance conditions. The commitments related to agreements to purchase certain services in the ordinary course of business, as of December 31, 2023 is approximately $932,000. All current contracts expire in 2024.

VTT Research Contract Extension

On January 31, 2024, the Company entered into the Third Amendment to the commission contract concerning VTT Technical Research Centre of Finland Ltd. ("VTT") to develop Dyadic's C1 fungal expression system for therapeutic protein production. The original contract was entered on June 28, 2019, and subsequently amended by the First Amendment on June 21, 2022 and the Second Amendment on September 9, 2022. Under the terms of the Third Amendment, the contract duration is extended to January 31, 2025 and Dyadic will pay VTT approximately a total of EUR €186,000 to continue developing Dyadic's C1-cell protein production platform for therapeutic protein production, including C1 host system. Dyadic retains the right to terminate the contract with 90 days' notice.

Legal Proceedings

We are not currently involved in any litigation that we believe could have a materially adverse effect in our financial condition or results of operations. From time to time, the Company is subject to legal proceedings, asserted claims and investigations in the ordinary course of business, including commercial claims, employment and other matters, which management considers immaterial, individually and in the aggregate. The Company makes a provision for a liability when it is both probable that a liability has been incurred and the amount of the loss can be reasonably estimated. The requirement for these provisions is reviewed at least quarterly and adjusted to reflect the impact of negotiations, settlements, rulings, advice of legal counsel and other information and events pertaining to a particular case. Litigation is inherently unpredictable and costly. Protracted litigation and/or an unfavorable resolution of one or more of proceedings, claims or investigations against the Company could have a material adverse effect on the Company's consolidated financial position, cash flows or results of operations.

Note 6: Share-Based Compensation

Description of Equity Plans

The 2021 Equity Incentive Award Plan (the "2021 Plan") was adopted by the Company's Board of Directors on April 9, 2021, and approved by the Company's Annual Meeting of Shareholders (the "Annual Meeting") on June 11, 2021. The 2021 Plan serves as a successor to the Company's 2011 Equity Incentive Plan (the "2011 Plan"). Since the adoption of the 2021 Plan, all equity awards were made from the 2021 Plan and no additional awards will be granted under the 2011 Plan. The 2021 Plan provides for the issuance of a variety of share-based compensation awards, including stock options, restricted stock awards, restricted stock unit awards, performance awards, dividend equivalents awards, deferred stock awards, stock payment awards and stock appreciation rights. As of April 16, 2021, the 2021 Plan increased the number of shares available for grant by 3,000,000 in addition to the number of shares remaining available for the grant of new awards under the 2011.

As of December 31, 2023, the Company had 5,469,247 stock options outstanding and an additional 2,773,406 shares of common stock available for grant under the 2021 Plan. As of December 31, 2022, there were 5,031,097 stock options outstanding and an additional 3,672,561 shares of common stock available for grant under the 2021 Plan.

Stock Options

Options are granted to purchase common stock at prices that are equal to the fair value of the common stock on the date the option is granted. Vesting is determined by the Board of Directors at the time of grant. The term of any stock option awards under the Company's 2011 Plan and 2021 Plan is ten years, except for certain options granted to the contractors which are either one or three years.

The grant-date fair value of each option grant is estimated using the Black-Scholes option pricing model and amortized on a straight-line basis over the requisite service period, which is generally the vesting period, for each separately vesting portion of the award as if the award was, in substance, multiple awards. Use of a valuation model requires management to make certain assumptions with respect to selected model inputs, including the following:

Risk-free interest rate. The risk-free interest rate is based on U.S. Treasury rates with securities approximating the expected lives of options at the date of grant.

Expected dividend yield. The expected dividend yield is zero, as the Company has never paid dividends to common shareholders and does not currently anticipate paying any in the foreseeable future.

Expected stock price volatility. The expected stock price volatility was calculated based on the Company's own volatility. The Company reviews its volatility assumption on an annual basis and has used the Company's historical volatilities.

Expected life of option. The expected life of option was based on the contractual term of the option and expected employee exercise and post-vesting employment termination behavior. The Company uses the weighted average vesting period and contractual term of the option as the best estimate of the expected life of a new option, except for the options granted to the CEO (i.e., 5 or 10 years) and certain contractors (i.e., 1 or 3 years).

The assumptions used in the Black-Scholes option pricing model for stock options granted for the years ended December 31, 2023 and 2022 are as follows:

	Years Ended December 31,	
	2023	**2022**
Risk-free interest rate	3.90% -5.12%	1.40% - 3.24%
Expected dividend yield	—%	—%
Expected stock price volatility	62.22% - 64.27%	61.30% - 61.58%
Expected life of options (in years)	1.13 -6.25	5.5 - 6.25

The following table summarizes the combined stock option activity under the Company's Equity Compensation Plans:

	Shares	Weighted-Average Exercise Price	Weighted-Average Remaining Contractual Term (Years)	Aggregate Intrinsic Value
Outstanding at December 31, 2021	4,774,215	$ 3.04	6.14	$ 8,413,444
Granted	865,825	4.43		
Exercised	(333,943)	1.63		
Expired	(200,000)	5.47		
Canceled	(75,000)	4.81		
Outstanding at December 31, 2022	5,031,097	$ 3.25	5.75	$ 13,000
Granted (1)	805,350	1.45		
Exercised	—	—		
Expired (2)	(351,520)	1.71		
Canceled (3)	(15,680)	3.50		
Outstanding at December 31, 2023	5,469,247	$ 3.08	5.66	$ 322,738
Exercisable at December 31, 2023	4,160,298	$ 3.15	4.81	$ 161,427

Notes:

(1) Represents the following stock options granted:

- Annual share-based compensation awards on January 3, 2023, including: (a) 406,250 stock options with an exercise price of $1.38 per share granted to executives and key personnel, upon one year anniversary, or vesting annually in equal installments over four years, (b) 262,500 stock options with an exercise price of $1.38 per share granted to members of the Board of Directors, vesting upon one year anniversary, (c) 24,100 stock options with an exercise price of $1.38 per share granted to employees, vesting annually in equal installments over four years, and (d) 15,000 stock options with an exercise price of $1.38 per share granted to a consultant, vesting upon one year anniversary.
- Throughout the year the following stock options were granted: (a) on May 30, 2023, 37,500 stock options with an exercise price of $2.23 per share granted to a consultant, vesting over two months from the grant date, (b) on September 15, 2023, 55,000 stock options with an exercise price of $1.75 per share granted to a consultant, vesting over a year and half from the grant date, and (c) on October 23, 2023, 5,000 stock options with an exercise price of $1.66 per share granted to an employee vesting annually in equal installments over four years.

(2) Represents the following stock options expired:

- 270,000 stock options with an exercise price of $1.39 per share granted to executive, (b) 25,000 stock options with an exercise price of $3.99 per share granted to a consultant, (c) 25,000 stock options with an exercise price of $1.75 per share granted to a member of the Board of Directors, (d) 31,520 stock options with an exercise price ranging between $1.39 and $5.27 per share granted to a former employee.

(3) Represents the cancellation of unvested portion of the stock options granted previously to a former employee with exercise price ranging between $1.39 to $5.27.

The weighted average grant-date fair market value of stock options granted for the years ended December 31, 2023 and 2022 was $0.81 and $2.49, respectively, based on the Black-Scholes option pricing model. The intrinsic value of options exercised for the years ended December 31, 2023 and 2022 was $0 and $365,000, respectively.

As of December 31, 2023 and 2022, total unrecognized compensation cost related to non-vested stock options granted under the Company's equity compensation plans was $559,121 and $919,000, respectively, which is expected to be recognized over a weighted average period of 2.68 years and 2.76 years, respectively. The Company adjusts unrecognized compensation cost for actual forfeitures as they occur.

Restricted Stock Units

Restricted stock units (the "RSUs") are granted subject to certain restrictions. Vesting conditions are determined at the discretion of the Board of Directors. The fair market value of RSUs is generally determined based on the closing market price of the stock on the grant date.

The following table summarizes the restricted stock award activity during the year ended December 31, 2023:

	Shares	Weighted-Average Grant Date Fair Value
Outstanding at December 31, 2022	—	$ —
Granted (1)	461,005	1.38
Vested (1)	(247,961)	1.38
Outstanding at December 31, 2023	213,044	$ 1.38

Notes:

(1) On January 3, 2023, the Company granted 247,961 RSUs with immediate vesting, to executives and key personnel in lieu of cash bonuses earned for the year ended 2022. The Company also granted 163,044 RSUs, vesting upon one year anniversary of the grant, to the Board of Directors as a result of the Board agreeing to a reduction in director cash compensation for 2023. On December 6, 2023, the Company granted 50,000 RSUs to a consultant, vesting at the end of the service period.

Compensation Expenses

We recognize all share-based payments to employees, consultants, and our Board, as non-cash compensation expense, in research and development expenses or general and administrative expenses in the consolidated statement of operations, and these charges had no impact on the Company's reported cash flows. Stock-based compensation expense is calculated on the grant date fair values of such awards, and recognized each period based on the value of the portion of share-based payment awards that is ultimately expected to vest during the period. Forfeitures are recorded as they occur.

For performance-based awards, the Company recognizes related stock-based compensation expenses based upon its determination of the potential likelihood of achievement of the specified performance conditions at each reporting date. There was no performance-based award recognized during the years ended December 31, 2023 and 2022.

Total non-cash stock option compensation expense was allocated among the following expense categories:

	Years Ended December 31,	
	2023	**2022**
General and administrative	$ 1,201,027	$ 1,661,025
Research and development	43,094	227,919
Total	$ 1,244,121	$ 1,888,944

The following table summarizes the Company's non-cash share-based compensation expenses:

	Years Ended December 31,	
	2023	**2022**
Share based compensation expense- stock options	$ 1,004,054	$ 1,888,944
Share based compensation expense- restricted stock units	240,067	—
Total	$ 1,244,121	$ 1,888,944

Note 7: Shareholders' Equity

Issuances of Common Stock

For the year ended December 31, 2023, there were 247,961 shares of the Company's common stock issued resulting from the vesting of restricted stock units with a weighted average issue price of $1.38 per share. For the year ended December 31, 2022, there were 333,943 shares of the Company's common stock issued resulting from the exercise of stock options, with a weighted average issue price of $1.63 per share.

Treasury Stock

As of December 31, 2023, and 2022, there were 12,253,502 shares of common stock held in treasury, at a cost of approximately $18.9 million, representing the purchase price on the date the shares were surrendered to the Company.

Note 8: Subsequent Events

For purpose of disclosure in the consolidated financial statements, the Company has evaluated subsequent events through March 28, 2024, the date the consolidated financial statements were available to be issued. Except for items mentioned in the notes, and as discussed below, management is not aware of any material events that have occurred subsequent to the balance sheet date that would require adjustment to, or disclosure in the accompanying financial statements.

2024 Annual Grants

On January 2, 2024, the Company granted an annual stock option award with an exercise price of $1.59, including: (a) 387,500 stock options granted to executives and key personnel, vesting upon one year anniversary, or annually in equal installments over four years, (b) 352,500 stock options granted to members of the Board of Directors, vesting upon one year anniversary, (c) 17,600 stock options granted to employees, vesting annually in equal installments over four years, and (d)15,000 stock options granted to a consultant, vesting upon one year anniversary.

On January 2, 2024, the Company granted 141,510 restricted stock units, vesting upon one year anniversary, to the Board of Directors as a result of reduction in director cash compensation of 2024. The grant of these RSUs has been approved by the Compensation Committee of the Board of Directors in December 2023.

On March 11, 2024, the Compensation Committee of the Board of Directors approved and granted an aggregate of 212,709 restricted stock units, vested in full, to executives and key personnel in lieu of cash bonus earned for the year ended December 31, 2023.

Senior Secured Convertible Promissory Notes

On March 8, 2024, the Company entered into a securities purchase agreement (the "Securities Purchase Agreement") pursuant to which the Company issued 8.0% Senior Secured Convertible Promissory Notes due March 8, 2027 in an aggregate principal amount of $6.0 million (the "Convertible Notes"). The purchasers of the Convertible Notes include immediate family members and family trusts related to Mark Emalfarb, our President and Chief Executive Officer and a member of our Board of Directors, including The Francisco Trust U/A/D February 28, 1996, an existing holder of more than 5% of our outstanding common stock, (collectively, the "Purchasers"). The Convertible Notes were sold in a private placement in reliance on the exemption from registration provided by Section 4(a)(2) of the Securities Act of 1933, as amended. The net proceeds from the sale of the Convertible Notes, after deducting offering expenses, will be approximately $5,850,000. The Company intends to use the net proceeds from the offering of the Convertible Notes for working capital and general corporate purposes.

The Convertible Notes will be senior, secured obligations of the Company and its affiliates, and interest will be payable quarterly in cash on the principal amount equal to 8% per annum, and guaranteed by Dyadic International (USA), Inc. under a subsidiary guarantee for the benefit of the holders of the Convertible Notes (each such holder, a "Holder").

The Convertible Notes will mature on March 8, 2027, unless earlier converted or redeemed in accordance with the terms of the Convertible Notes. The Convertible Notes are secured by a first priority lien on substantially all assets of the Company and its subsidiary, Dyadic International (USA), Inc., pursuant to the Security Agreement (as defined below).

The Convertible Notes are convertible into shares of the Company's common stock, in whole or in part, at the option of the Holders at any time, based on an initial conversion price of $1.79 per share of common stock, subject to adjustment in certain circumstances; provided that the Company shall not effect any Conversion of a Note and the Holder thereof shall not have any right to convert any portion of such Note to the extent that, after giving effect to such conversion, such Holder would beneficially own shares of the company in excess of the limits provided in the applicable Convertible Notes; provided further that the Company shall not issue any common stock pursuant to the terms of the Convertible Notes if such issuance would exceed 19.99% of the Company's issued and outstanding Common Stock on date of the Purchase Agreement or otherwise exceed the aggregate number of shares of Common Stock which the Company may issue without breaching the Company's obligations under the rules or regulations of Nasdaq.

The Holders may require the Company to redeem all or any part of the Convertible Notes on a redemption date falling on any of the 18, 21, 24, 27, 30, and 33-month anniversaries of the original issue date of the Convertible Notes (any such date, a "Redemption Date") upon not less than 60 calendar days written notice prior to the applicable Redemption Date. The Company may also elect to redeem all or any part of the Convertible Notes on a Redemption Date upon not less than 60 calendar days written notice prior to the applicable Redemption Date.

The Convertible Notes contain customary terms and covenants and customary events of default ("Events of Default"). Upon the occurrence of any Event of Default, at the Holder's election, the outstanding principal amount of the applicable Convertible Notes, plus accrued but unpaid interest, liquidated damages, and other amounts owing in respect thereof through the date of acceleration, shall become immediately due and payable. After the occurrence of any Event of Default that results in the eventual acceleration of any Note, the interest rate on such Note shall accrue at an interest rate equal to 18% per annum (with a credit for any "unused" guaranteed interest).

The Securities Purchase Agreement also contains certain affirmative and negative covenants (including, without limitation, restrictions on our ability to incur indebtedness, permit liens, make dividends or certain debt payments or consummate certain affiliate transactions) and customary representations and warranties of the Company and the Purchasers, indemnification obligations of the Company, termination provisions, and other obligations and rights of the parties.

The Company also entered into a registration rights agreement (the "Registration Rights Agreement") with the Purchasers, pursuant to which the Company has agreed to register under the Securities Act any common stock of the Company issuable upon conversion of the Convertible Notes.

The Company also entered into a security agreement (the "Security Agreement") with the Purchasers, pursuant to which the Company granted the Purchasers a continuing security interest in certain collateral to secure the full and prompt payment, performance and observance of all present and future indebtedness, obligations, liabilities and agreements of any kind of the Company to the Purchasers arising under or in connection with the Convertible Notes.

Dyadic International (USA), Inc., a subsidiary of the Company (the "Guarantor") also entered into a subsidiary guarantee (the "Subsidiary Guarantee") with the Purchasers, pursuant to which the Guarantor has guaranteed to the Purchasers the prompt and complete payment and performance when due of the obligations under the Securities Purchase Agreement.

Board of Directors

Mark A. Emalfarb

Patrick Lucy

Jack L. Kaye

Seth J. Herbst, MD

Arindam Bose, Ph.D.

Barry C. Buckland, Ph.D.

Michael P. Tarnok

Executive Officers

Mark A. Emalfarb, *President and Chief Executive Officer*

Ping W. Rawson, *Chief Financial Officer*

Joseph Hazelton, *Chief Operating Officer*

Ronen Tchelet, *Vice President of Research and Business Development*