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

FORM 10-K

(Mark One)

☒ **ANNUAL REPORT PURSUANT TO SECTION 13 OR 15(d) OF THE SECURITIES EXCHANGE ACT OF 1934**

For the fiscal year ended December 31, 2023

OR

☐ **TRANSITION REPORT PURSUANT TO SECTION 13 OR 15(d) OF THE SECURITIES EXCHANGE ACT OF 1934**

For the transition period from _____ to _____

Commission file number 001-40497

TELESIS BIO INC.
(Exact name of registrant as specified in its charter)

Delaware **(State or other jurisdiction of incorporation or organization)**	**45-1216839** **(I.R.S. Employer Identification No.)**
10431 Wateridge Circle, Suite 150 **San Diego, CA** **(Address of Principal Executive Offices)**	**92121** **(Zip Code)**

(858) 228-4115
Registrant's telephone number, including area code

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

Title of each class	Trading Symbol(s)	Name of each exchange on which registered
Common Stock, $0.0001 par value per share	**TBIO**	**Nasdaq Global Select Market**

Securities registered pursuant to section 12(g) of the Act: None.

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

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

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

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 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, or a smaller reporting company or an emerging growth company. See the definitions of "large accelerated filer," "accelerated filer," "smaller reporting company" and "emerging growth company" in Rule 12b-2 of the Exchange Act.:

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

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

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

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

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

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

The aggregate market value of voting stock held by non-affiliates of the Registrant on June 30, 2023, based on the closing price of $1.58 for shares of the Registrant's common stock as reported by the Nasdaq Global Select Market, was approximately $14.2 million. In determining the market value of non-affiliate common stock, shares of common stock beneficially owned by each executive officer, director, and holder of more than 5% of our common stock have been excluded in that such persons may be deemed to be affiliates. This determination of affiliate status is not necessarily a conclusive determination for other purposes.

The registrant had outstanding 30,103,284 shares of common stock as of March 28, 2024.

DOCUMENTS INCORPORATED BY REFERENCE

Portions of the registrant's definitive Proxy Statement relating to the 2024 Annual Meeting of Stockholders are incorporated herein by reference in Part III of this Annual Report on Form 10-K to the extent stated herein. The proxy statement will be filed with the Securities and Exchange Commission within 120 days of the registrant's fiscal year ended December 31, 2023.

TABLE OF CONTENTS

		Page
Part I		
Item 1.	Business	5
Item 1A.	Risk Factors	33
Item 1B.	Unresolved Staff Comments	70
Item 1C.	Cybersecurity	70
Item 2.	Properties	71
Item 3.	Legal Proceedings	72
Item 4.	Mine Safety Disclosures	72
Part II		
Item 5.	Market for Registrant's Common Equity, Related Stockholder Matters and Issuer Purchases of Equity Securities	73
Item 6.	[Reserved]	74
Item 7.	Management's Discussion and Analysis of Financial Condition and Results of Operations	75
Item 7A.	Quantitative and Qualitative Disclosures About Market Risk	90
Item 8.	Financial Statements and Supplementary Data	F-1
Item 9.	Changes in and Disagreements with Accountants on Accounting and Financial Disclosure	91
Item 9A.	Controls and Procedures	91
Item 9B.	Other Information	92
Item 9C.	Disclosure Regarding Foreign Jurisdictions that Prevent Inspections	92
Part III		
Item 10.	Directors, Executive Officers and Corporate Governance	93
Item 11.	Executive Compensation	93
Item 12.	Security Ownership of Certain Beneficial Owners and Management and Related Stockholder Matters	93
Item 13.	Certain Relationships and Related Party Transactions, and Director Independence	93
Item 14.	Principal Accounting Fees and Services	93
Item 15.	Exhibits, Financial Statement Schedules	94
Item 16.	Form 10-K Summary	97
Signatures		98

SPECIAL NOTE REGARDING FORWARD-LOOKING STATEMENTS

This Annual Report on Form 10-K for the fiscal year ended December 31, 2023 (Annual Report), contains forward-looking statements. All statements other than statements of historical facts contained in Annual Report, including statements regarding our future results of operations and financial position, business strategy, research and development costs, timing and likelihood of success, as well as plans and objectives of management for future operations, are forward-looking statements. These statements involve known and unknown risks, uncertainties and other important factors that are in some cases beyond our control and may cause our actual results, performance or achievements to be materially different from any future results, performance or achievements expressed or implied by the forward-looking statements.

In some cases, you can identify forward-looking statements by terms such as "aim," "anticipate," "assume," "believe," "contemplate," "continue," "could," "due," "estimate," "expect," "goal" "intend," "may," "objective" "plan," "predict," "potential," "project," "seek," "should," "target," "will," "would," and other similar expressions that are predictions of or indicate future events and future trends, or the negative of these terms or other comparable terminology. Forward-looking statements contained in this Annual Report include, but are not limited to, statements about:

- estimates of the synthetic biology market, market growth, and new market expansion;
- our future revenue, expenses, capital requirements and our needs for additional financing;
- our expectations regarding the rate and degree of market acceptance of our BioXp systems, BioXp kits and benchtop reagents;
- the ability of our products to facilitate the screen-design-build-test paradigm of synthetic biology;
- our ability to remediate the material weakness in our internal controls and procedures identified by management;
- the size and growth of the synthetic biology market and competitive companies and technologies and our industry;
- our ability to manufacture our products and materials used in our products;
- our ability to obtain financing in future operations;
- our ability to continue as a going concern;
- our ability to manage and grow our business;
- our ability to develop and commercialize new products;
- our ability to establish and maintain intellectual property protection for our products or avoid or defend claims of infringement;
- the performance of third-party manufacturers and suppliers and our ability to qualify second-source suppliers;
- the potential effects of government regulation;
- our ability to hire and retain key personnel and to manage our future growth effectively;
- our ability to repay our outstanding debt obligations;
- the volatility of the trading price of our common stock;
- the impact of local, regional, and national and international economic conditions and events, including the war between Russia and Ukraine and ongoing hostilities in the Middle East;
- our expectations about market trends;
- our anticipated use of our existing resources; and
- other risks and uncertainties, including those listed in the section titled "Risk Factors."

We have based these forward-looking statements largely on our current expectations and projections about our business, the industry in which we operate and financial trends that we believe may affect our business, financial condition, results of operations and prospects, and these forward-looking statements are not guarantees of future performance or development. These forward-looking statements speak only as of the date of this Annual Report and are subject to a number of risks, uncertainties and assumptions described in the section titled "Risk Factors" and elsewhere in this Annual Report. Because forward-looking statements are inherently subject to risks and uncertainties, some of which cannot be predicted or quantified, you should not rely on these forward-looking statements as predictions of future events. The events and circumstances reflected in our forward-looking statements may not be achieved or occur and actual results could differ materially from those projected in the forward-looking statements. Except as required

by applicable law, we undertake no obligation to update or revise any forward-looking statements contained herein to reflect events or circumstances after the date of this Annual Report, whether as a result of any new information, future events or otherwise.

In addition, statements that "we believe" and similar statements reflect our beliefs and opinions on the relevant subject. These statements are based upon information available to us as of the date of this Annual Report, and while we believe such information forms a reasonable basis for such statements, such information may be limited or incomplete, and our statements should not be read to indicate that we have conducted an exhaustive inquiry into, or review of, all potentially available relevant information. These statements are inherently uncertain and you are cautioned not to unduly rely upon these statements.

We use the Telesis Bio logo, BioXp, Gibson Assembly, RapidAMP, Vmax, CleanCap and other marks as trademarks in the United States and other countries. This Annual Report contains references to our trademarks and service marks and to those belonging to other entities. Solely for convenience, trademarks and trade names referred to in this Annual Report, including logos, artwork and other visual displays, may appear without the ® or TM symbols, but such references are not intended to indicate in any way that we will not assert, to the fullest extent under applicable law, our rights or the rights of the applicable licensor to these trademarks and trade names. We do not intend our use or display of other entities' trade names, trademarks or service marks to imply a relationship with, or endorsement or sponsorship of us by any other entity.

SUMMARY OF RISKS ASSOCIATED WITH OUR BUSINESS

Our business is subject to numerous risks and uncertainties that you should consider before investing in our securities. These risks are described more fully below in Item 1.A. These risks include, but are not limited to, the following:

- We are an early-stage multi-omic and synthetic biology technology company with a history of net losses, which we expect to continue, and we may not be able to generate meaningful revenues or achieve and sustain profitability in the future;
- we have a limited operating history, which may make it difficult to evaluate the prospects for our future viability and predict our future performance;
- our operating results may fluctuate significantly in the future, which makes our future operating results difficult to predict and could cause our operating results to fall below expectations or any guidance we may provide;
- we will need to raise additional capital to fund our continuing operations, which may be unavailable to us on acceptable terms or at all or may cause dilution or place significant restrictions on our ability to operate as a going concern. Our 2022 Loan Agreements may limit our flexibility in financing and operating our business and may adversely affect our business, financial condition and results of operations;
- our management has identified a material weakness in our internal controls;
- sales of shares of our common stock underlying the Redeemable Convertible Preferred Stock and Warrants issued in our recent private placement may cause the market price of our shares to decline;
- we have defaulted under our 2022 Loan Agreements with MidCap and there is continued risk of additional defaults under the 2022 Loan Agreements. The remaining balance of the 2022 Loan Agreements continues to be governed by restrictive covenants that limit our operations and allows MidCap to call our loans if there are additional events of default. Our inability to fulfill these debt obligations could adversely affect working capital needs and financial condition. Further, our 2022 Loan Agreements may limit our flexibility in financing and operating our business, which may adversely affect our business, financial condition and results of operation;
- the holders of Redeemable Convertible Preferred Stock have rights, preferences and privileges that are not held by, and are preferential to, the rights of our common stockholders;
- our directors, officers and principal stockholders have significant voting power and may take actions that may not be in the best interests of our other stockholders;
- our independent registered public accounting firm's report contains an explanatory paragraph that expresses substantial doubt about our ability to continue as a "going concern";
- adverse developments affecting the financial services industry, including events or concerns involving liquidity, defaults or non-performance by financial institutions, could adversely affect our business, financial condition or results of operations;
- we may not be able to achieve or maintain satisfactory pricing and margins for our products;
- if we fail to timely introduce compelling new products, our revenues and our prospects could be harmed;

- the size of the markets for our products may be smaller than estimated, and new market opportunities may not develop as quickly as we expect, or at all, thus limiting our ability to successfully meet our anticipated revenue projections;
- we have limited experience in sales and marketing of our products. If we are unable to expand our sales, marketing distribution and customer service and support capabilities, we may not be successful in commercializing our current and future products;
- we began manufacturing our BioXp products and certain materials used in our BioXp products in-house in 2023. We have limited experience manufacturing our products and if we directly or indirectly encounter problems manufacturing our products or materials, our business and financial results could suffer;
- we currently rely on single source suppliers for certain components of our instruments and raw materials. If these suppliers should fail or not perform satisfactorily, our ability to commercialize and supply our products would be adversely affected; and
- if we are unable to obtain and maintain sufficient intellectual property protection for our products and technology, or if the scope of the intellectual property protection obtained is not sufficiently broad, our competitors could develop and commercialize products similar or identical to ours, and our ability to successfully commercialize our products and build a strong brand identity may be impaired.

Part I
BUSINESS

Overview

We are a leader in automated multi-omic and synthetic biology solutions focused on providing applications to enable researchers to rapidly, accurately and reproducibly build or "write" high-quality synthetic DNA and mRNA and short oligonucleotides that are ready to use in many downstream synthetic biology enabled markets. Our solutions address the bottlenecks across the multi-step process of building DNA and mRNA, as well as the significant limitations of existing solutions that prevent the rapid building of high-quality DNA and mRNA at a useable scale. A key part of our on-market solution are our BioXp systems, which are end-to-end automated workstations that fit on the benchtop or in the lab and are broadly accessible due to their ease-of-use and hands-free automation. We believe our BioXp systems and future product offerings can democratize synthetic biology by simplifying the process of building DNA and mRNA and preparing samples for next generation sequencing (NGS), thereby accelerating the discovery, development and production of novel high-value products, including antibody-based biologics, mRNA-based vaccines and therapeutics and precision medicines.

Synthetic biology and NGS involve the reading and writing of biological components within multiple markets, including:

- healthcare, to discover, develop and produce novel therapeutics and vaccines;
- agriculture, to improve crop yields and create novel food sources;
- technology, to potentially store and retrieve digital data using DNA; and
- various consumer markets.

Synthetic biology is enabled by numerous technologies that facilitate the *screen-design-build-test* paradigm of new or modified biological components. Any inefficiency across these four phases can create a bottleneck hindering the rapid iteration within product development.

Within the initial screening phase, multiple technologies are utilized to screen targeted material, one of those is NGS. If cost is prohibitive or workflows are too cumbersome, scientists cannot screen the number of target materials. If errors in manual work or a lack of resources exists, all downstream work in the build phase will be limited in scope.

In the build phase, the process of writing synthetic DNA or mRNA for an improved biological function is characterized by multiple, complex processes that involve numerous time-consuming and technical steps, including DNA synthesis, DNA assembly, DNA cloning, and DNA scale-up in *E. coli* with multiple DNA purification steps in between. In the case of mRNA, the process continues with additional technical steps including mRNA synthesis, mRNA modifications at each end and multiple mRNA purification steps. Currently, these processes are carried out in laboratories by highly skilled researchers using multiple kits, each designed to perform one or more of the technical steps. Whether in-house or through a contract research organization (CRO), existing solutions for building synthetic DNA and mRNA have deficiencies, for instance:

- inconsistent levels of fidelity of DNA and mRNA fragments reducing overall yields of usable material;
- inability to construct stretches of DNA and mRNA sequence that have particular features;
- inability to construct DNA and mRNA sequences above a certain size; and
- inability to produce the end product and quantities appropriate for downstream applications.

All of these limitations produce bottlenecks across the build phase, which have significantly hindered the ability of synthetic biology to deliver on its full potential.

We develop solutions to address the significant unmet need in the market for an approach that can automate, integrate, optimize and standardize the process for building synthetic DNA and mRNA. Our on-market and our planned solutions are comprised of the following:

- *BioXp 3250 system*: which we believe are the first commercially available push-button, walkaway, end-to-end automated workstations that empower researchers to go from a digital DNA sequence to endpoint-ready synthetic DNA in as few as 8 hours and mRNA in less than 24 hours, exclusive of shipment time, with onboard NGS library preparation;
- *BioXp 9600 system*: a walkaway, higher throughput, next generation end-to-end automated workstation that empowers researchers to go from a digital DNA sequence to endpoint-ready synthetic DNA in as few as 8 hours and mRNA in less than 24 hours, exclusive of shipment time, with onboard NGS library preparation

- *BioXp portal*: a user-friendly online portal that offers an intuitive guided workflow, complexity analysis capability and sequence optimization tools for building new DNA sequences and assembling them into vector(s) of choice as well as mRNA constructs;
- *BioXp De Novo kits*: will contain all the necessary building blocks and reagents, including our proprietary Gibson Assembly branded reagents, for specific synthetic biology workflow applications;
- *BioXp Select kits:* offer customers the ability to use non-Telesis Bio DNA while using the BioXp system to perform synthetic biology workflow applications such as cloning, mRNA generation from plasmid and cell free amplification;
- *BioXp Next Generation Sequencing kits:* will contain all the necessary reagents to go from DNA or RNA to a sequencer-ready library;
- *Benchtop reagents*: contain all the reagents necessary to proceed with a specific synthetic biology workflow on the benchtop using products generated on the BioXp system; and
- *Custom Gibson Short Oligo Ligation Assembly (SOLA) enzymatic DNA synthesis (EDS) solutions*: is a sustainable, scalable, and cost-effective approach designed to significantly reduce timelines for constructing synthetic DNA, RNA, and proteins compared to traditional chemical synthesis, paving the way for more efficient and effective development of mRNA-based vaccines, diagnostics, therapeutics, and personalized medicines.

We believe that our integrated BioXp systems, BioXp kits and Gibson SOLA EDS solutions, when launched, will represent the industry's leading multi-omic molecular biology workflow automation solution and provide us with a first mover advantage in the rapidly growing synthetic biology market. As part of our continuing effort to improve the processes of synthetic biology, we continue to expand our range of offerings with the goal of transforming rapid demand-response workflows in synthetic biology and consolidating supply chains and enabling global distributed manufacturing for discovery, pre-clinical and clinical applications.

Our vision is to empower researchers with the tools to build synthetic biology in their laboratory, without constraints. Our BioXp systems are intended to address the needs of the synthetic biology customer by providing an unmatched capability to rapidly synthesize high-quality DNA and mRNA. With future system releases and extensions, we plan to address the continuum of research needs across the central dogma of molecular biology by enabling cell-free production of high-quality synthetic DNA, mRNA and protein for the discovery, development and manufacturing of enabled products across a wide range of markets. We are strategically focused on providing workflow solutions for markets with high-value enabled products such as those in healthcare and technology.

We currently provide workflow solutions for the following areas:

- synthetic DNA for antibody and protein engineering of biologic drugs;
- synthetic DNA for genome editing;
- synthetic DNA for metabolic pathway engineering;
- immune monitoring;
- synthetic mRNA for cancer and infectious disease vaccine discovery and development;
- mRNA-based vaccines for precision medicine and cell therapies; and
- mRNA-based therapeutics.

We are currently developing workflow solutions for the following areas:

- very high throughput customized solutions for rapid on-premise generation of DNA and RNA using Gibson SOLA enzymatic synthesis; and
- expanded mRNA workflows to include additional capabilities for customization of constructs of interest for mRNA therapeutic development.

We have placed approximately 300 BioXp systems globally. As of December 31, 2023, our customer base was composed of more than 500 customers and included 17 of the 20 largest biopharmaceutical companies in the world ranked by 2023 revenue.

Early Access Collaboration and Licensing Agreement with Pfizer

In December 2021, we entered into a Research Collaboration and License Agreement with Pfizer Inc. (Pfizer) pursuant to which we agreed to collaborate with Pfizer to further develop our novel enzymatic DNA synthesis technology for Pfizer's use in its research and development of mRNA-based vaccines and biotherapies. In December 2022 we achieved, and were paid for, the first technical

milestone under that agreement. During the second and fourth quarters of 2023, we achieved, and were subsequently paid for the second and third technical milestones under the same agreement. We are also eligible to receive additional milestone payments based on the achievement of specified development, regulatory and commercialization goals associated with any products developed from the application of our technology developed and licensed under the agreement.

Acquisition of EtonBio, Inc.

In November 2021, we completed the acquisition of EtonBio Inc. (Eton), a San Diego-based biotech company specializing in synthetic biology products and services, including DNA sequencing and oligo synthesis, for the global academic research, pharmaceutical and biotechnology industries. Eton utilizes innovative techniques, sustainable practices and exceptional customer service to meet the research community's need for high-quality DNA sequencing and oligo synthesis. Eton also markets DNA prep services and products such as antibodies, peptides and metabolism assay kits.

Industry Overview

Background on Synthetic Biology

Synthetic biology is a well-established and rapidly expanding field of science that involves the engineering of biological components such as genes, mRNA, proteins, viruses and living cells starting from a digital DNA sequence, enabling the construction of those macromolecules and organisms with new and improved biological functions. The application of synthetic biology is constantly expanding, and new end markets are emerging, driven by continued innovation, a growing understanding of biology and access to novel research tools. For example, in healthcare, synthetic biology is being used to discover, develop and produce novel DNA-, mRNA-, and protein-based therapeutics and vaccines (e.g., antibody-based biologics, mRNA-based COVID-19 vaccines and personalized cancer therapeutics). In agriculture, synthetic biology is being utilized to improve crop yields and create novel food sources (e.g., plant-based meat products). Similarly, in technology, synthetic biology may lead to the ability to store and retrieve digital data using DNA.

Synthetic biology is particularly important in pharmaceuticals, as it allows companies to fully develop opportunity spaces for specific proteins. This is possible because the coding sequence for any particular protein can be mutated randomly and optimized using rapid DNA-synthesis formats. Synthetic biology tools can also be used to develop more efficient production systems for drugs, particularly antibiotics and vaccines.

Enabling products' growth is being driven by the use of new gene-editing tools for drug discovery and development, as well as the strong demand for DNA sequencing to verify the fidelity of edited DNA constructs.

The synthetic biology market falls into two broad sectors:

- Enabling technologies: The molecular biology methods (e.g., DNA sequencing, DNA synthesis, DNA assembly, molecular cloning, mRNA production, protein synthesis and expression, genome editing, and bioinformatics software for DNA sequence design and analysis) that employ molecular biology components (e.g., oligonucleotides, enzymes, buffers, vectors, and competent cells) to engineer higher value products that have new or improved utility from a DNA sequence "blueprint".
- Enabled products: These are the end products and include, but are not limited to, therapeutics based on principles of antibody and protein engineering of biologic drugs, mRNA-based vaccines, genetic medicines (e.g. DNA and mRNA therapeutics), and sustainable foods and biofuels resulting from the use of synthetic biology, as well as DNA data storage solutions.

A driver of the rapid growth of the synthetic biology market is the advances in enabling technologies and the downstream benefits being realized in key enabled product markets like healthcare. These advances in enabling technologies have increased market demand for high-value products that can be produced by synthetic biology methods. This in turn has resulted in a rapid growth of synthetic biology CROs and molecular biology reagent kits, which have been created to serve the higher demand requirements of an evolving synthetic biology market, particularly for drug discovery, agriculture, consumer and industrial products. Scientists increasingly want to build DNA and introduce those molecules into organisms to create cell-based discovery and production systems for new biologics and small-molecule drugs. Research clinicians are recognizing the importance of synthetic biology and beginning to apply the construction of synthetic DNA and mRNA to the development of precision medicines, in the form of mRNA-based cancer vaccines, particularly for immuno-oncology. Pharmaceutical companies have begun integrating synthetic biology approaches in their facilities to develop state-of-the-art vaccines and biologics that are DNA-, mRNA-, and protein-centric. All of these approaches require the ability to make high-quality synthetic DNA comprising entire gene sequences and, in some instances, expressing those genes to make synthetic mRNA and synthetic proteins. With the success of FDA-approved mRNA-based COVID-19 vaccines, it is expected that interest in mRNA-based therapeutics and vaccines utilizing synthetic biology technology will remain strong.

Synthetic biology is enabled by numerous technologies that facilitate highly-iterative experimental design. These technologies permit "reading" of the DNA code of a desired gene, engineering and synthetic construction of biological products using those blueprints, and testing of the constructed products to determine whether they perform in the desired manner. Once a DNA sequence is read, the gene of interest can be built or written from a pool of building blocks using molecular synthesis techniques. In addition, once a gene is read, researchers can redesign the gene to produce new and improved biological functionality, and then build the redesigned gene and analyze its activity in a fully biological system during a test phase. Reading is then used once again to confirm the DNA sequence that provides the desired function of the biological sample that was designed, built and tested. Reading and writing genes opens the door to a new synthetic biology paradigm for iterating on the *screen-design-build-test* phases and creates a powerful and flexible approach to developing a wide variety of enabled products, including mRNA-based vaccines and protein-based drugs. Decades of gene sequencing work and functional genetic studies to understand what genes do have produced a huge cache of content that researchers can use to design new or modified genetic material.

Over the last 20 years, synthetic biology has experienced a transformation, driven by numerous innovations in enabling technologies. The initial breakthrough was DNA sequencing for reading the DNA and beginning to understand DNA coding. However, early sequencing instruments were slow and expensive, creating a bottleneck in the use of genetic sequence data and its application to both additional research and commercial applications. More recently, the advent of high-performance, low-cost next-generation sequencing (NGS) systems has enabled wide adoption, with over 15,000 such systems installed in research labs globally, resulting in an increase in genetic discoveries in humans and a wide range of organisms, including bacteria, plants and insects and animals. These sequencing systems are generating large amounts of information about genetic composition and have led to the creation of private and public databases around the world containing DNA sequences. Recently, advances in computing power, machine learning and computational modeling have enabled biologists to better analyze this increasing amount of genomic information and inform experimental design or engineering of genes, genetic pathways and even complete chromosomes to achieve the desired biological improvement. Given the volume and understanding of DNA sequence content, the bottleneck in synthetic biology has shifted from reading to writing DNA in an effort to facilitate the rapid design of DNA and mRNA for use in the downstream synthetic biology enabled markets.

The next critical advancement in the field of synthetic biology was the ability to construct genetic sequences *de novo* from their chemical components via DNA synthesis. This enabled researchers to capitalize on the genetic discoveries and improvements in computational design to build or write engineered DNA. The advancements in enabling technologies for both reading and writing DNA have allowed synthetic biologists to engineer changes in genes, metabolic pathways and organisms with greater ease, precision and scale, resulting in a new paradigm with rapid iteration of product cycles and greater predictability of results. The following graphic illustrates this paradigm.

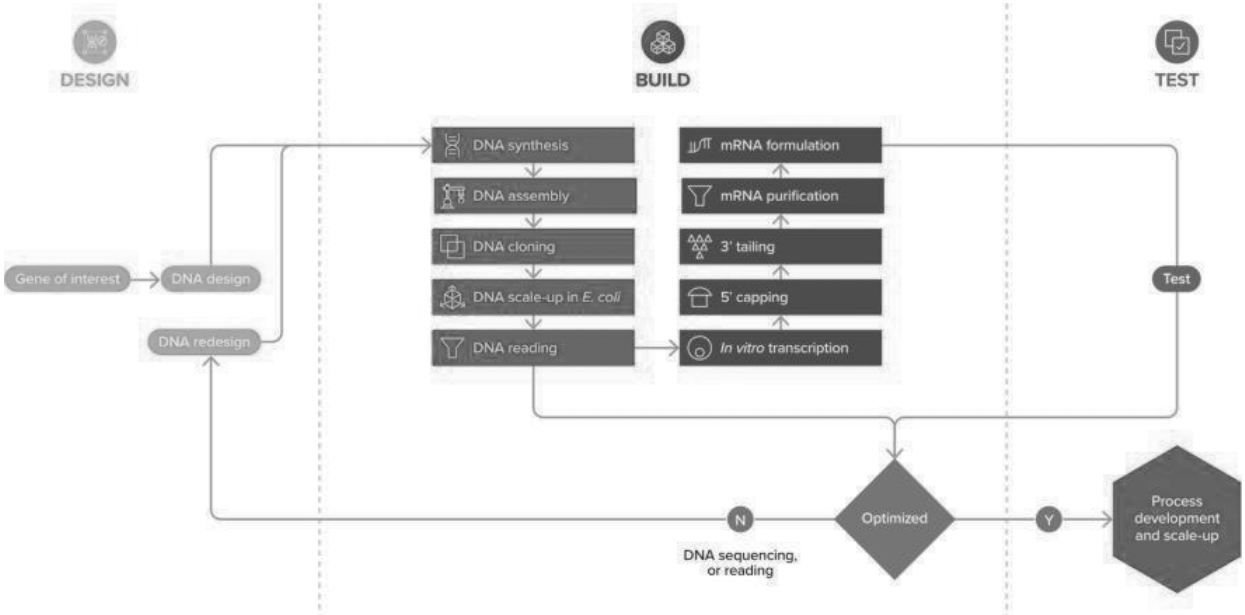
This new paradigm is characterized by four key steps— *screen, design, build, test*—which are continuously iterated to drive feedback into the design phase for the following iteration until the desired biological result is achieved. With DNA as the software of life, biologists can now write code like software engineers and write genes to perform as desired. The *screen-design-build-test* synthetic biology paradigm begins with the DNA sequencing or reading of a biological sample, providing a "blueprint" for the design phase. The outcome of the design phase is a DNA sequence that is chemically synthesized in the build phase and, as necessary, converted to mRNA or protein. The outcome of the build phase is synthetic DNA, mRNA or protein, which can then be readily assayed for desired function in the test phase.

Under the current paradigm, DNA readers are integrated within the build and test phases to confirm the blueprints are being generated as expected in the build phase for quality control and to identify the DNA sequence of the optimal blueprint discovered in the test phase. If the outcome of the test phase is that further optimization is desired, the process is iterated again, starting at the design phase. This *screen-design-build-test* paradigm highlights the importance and opportunity for products and technologies focused on enhancing the speed and scale of the design phase. This efficiency can be accomplished by placing scalable platform technologies for reading and writing in close proximity.

The Build Phase for Synthetic DNA and mRNA

Any inefficiencies across the screen, design, build, or test phase can create a bottleneck in the highly-iterative *screen-design-build-test* paradigm. This especially holds true for the build phase as the process of "writing" synthetic DNA for an improved biological function is characterized by multiple, complex processes that involve numerous time-consuming and technical steps, including (1) DNA synthesis; (2) DNA assembly; (3) DNA cloning; and (4) DNA scale-up in *E. coli*.

Figure 1: The Build-Phase


DESIGN
BUILD
TEST
Gene of interest
DNA design
DNA redesign
DNA synthesis
DNA assembly
DNA cloning
DNA scale-up in E. coli
DNA reading
mRNA formulation
mRNA purification
3' tailing
5' capping
In vitro transcription
Test
N
DNA sequencing, or reading
Optimized
Y
Process development and scale-up

Writing synthetic DNA

1. *DNA synthesis*: DNA is made from four molecular building blocks called nucleotides: adenine (A), cytosine (C), guanine (G) and thymine (T). These closely related molecules form long linear chains consisting of thousands or more nucleotides. In the same way that the "zeroes" and "ones" in digital code can instruct a machine or other computer code to act, the specific order of nucleotides in a strand of DNA imparts the information for an organism to make proteins, which ultimately control the chemical reactions that enable cellular function.
    - The first step towards building synthetic DNA begins with determining the precise sequence of nucleotides of the gene to be synthesized. Computational tools are typically employed to modify, in silico, the sequence of the gene to achieve the desired improvement in biological function.
    - Next, due to challenges in synthetically manufacturing long sequences of DNA, various bioinformatics tools are used to break the desired in silico DNA sequence into short, overlapping pieces of approximately 60 nucleotides in length.
    - The in silico "blueprints" for the desired DNA fragment or gene are then converted into the physical pieces of DNA. To do so, each nucleotide of the desired short gene fragment specified in the blueprints is chemically synthesized and linked together to form oligonucleotides.
2. *DNA assembly*: During this process, overlapping oligonucleotides are "stitched" together using a complex series of chemical reactions, using enzymes, salts and buffers. These reactions are performed at various temperatures for a large number of cycles until the desired synthetic gene fragment or gene has been assembled.
3. *DNA cloning*: The resulting synthetic DNA product is typically combined with a DNA vector, which is a circular piece of DNA that acts as a vehicle to transport synthetic DNA fragments or genes, to create a recombinant DNA product for introduction into a host organism. Most commonly this host organism is *E. coli,* and it will easily grow into a large population for purposes of producing more of the desired synthetic DNA fragment or gene product.
4. *DNA scale-up in E. coli: E. coli* cells containing new DNA are plated on Petri dishes, and after a period of growth will result in individual colonies. The colonies of *E. coli* are placed in growth medium and incubated to produce a culture of cells containing the cloned vector. The synthetic DNA is isolated from the cultured cells, and is purified and further processed for DNA sequencing and then analyzed with DNA design tools. Introducing the recombinant DNA product into *E. coli* serves two purposes: first, the methodology filters out intended DNA sequences from unintended DNA sequences that arise from chemical synthesis of oligonucleotides, which is an imperfect process; and second, it permits exponential scaling up of the amount of synthetic DNA to meaningful quantities for use in downstream applications.

Writing synthetic mRNA

Recently, the building of mRNA has emerged as a highly attractive system for the development of both therapeutics and vaccines, with hundreds of such projects currently in various stages of development. The Moderna and Pfizer COVID-19 vaccines approved by the FDA are both mRNA products. Like DNA, mRNA takes the form of long chains of nucleotides. mRNA transports the instructions encoded in DNA to downstream molecules for molecular "fulfillment" of protein synthesis, in essence acting as DNA's messenger.

Similar to building synthetic DNA, the steps required to build mRNA are numerous, time-consuming and often fraught with difficulties, further, RNA is generally more unstable than DNA, increasing the challenge of synthesis and handling. The steps involved in synthesizing mRNA include all the steps necessary to make synthetic DNA in addition to those outlined below. DNA is used as a template to create mRNA, and this is completed as follows:

1. In vitro transcription: The cloned, circular synthetic DNA template is linearized and incubated in an enzymatic reaction containing all the components necessary to turn the synthesized DNA template into the desired mRNA that is then purified.
2. 5' capping: The mRNA is then further processed to include a "cap" at its 5' end to improve its efficiency as a driver of protein production within cells. The mRNA is then purified once more.
3. 3' tailing: The capped mRNA then has a poly A tail added at the 3' end to stabilize it and prevent its degradation and is then purified once more.
4. mRNA purification: The synthetic mRNA is treated with a DNase enzyme to remove any residual DNA template that may interfere with downstream applications and is then purified one final time.
5. mRNA formulation: The mRNA is then formulated by adding carrier molecules (e.g., lipid nanoparticles) to permit its delivery into cells.

Following these steps, the synthetic mRNA is ready to be used in downstream synthetic biology-enabled markets including, in the case of new drug development, biologics (antibody- and protein-based drugs), mRNA-based vaccines for infectious disease and precision medicine, genome and pathway engineering and many other markets.

Key limitations in writing synthetic DNA and mRNA

Despite these substantial advancements, including the accumulation of a large number of functional discoveries resulting from the wide-spread adoption of DNA sequencing instruments, the profound potential of synthetic biology has been hampered by the complexity within, and among, the multi-step process of writing synthetic DNA and mRNA, as well as significant limitations of existing solutions that prevent the rapid building of high-quality DNA and mRNA at a useable scale. Both limitations ultimately affect speed and quality of product delivery.

Currently, the process of writing synthetic DNA or mRNA for an improved biological function is carried out in laboratories by highly skilled researchers using multiple kits, each designed to perform one or more of the technical steps. Depending on the length and complexity of the desired synthetic DNA or mRNA product, the process may involve hundreds of manual steps, require numerous different kits and take days, weeks or months to complete. As an alternative solution, many, but not all, of these steps can be outsourced to a molecular biology CRO for completion, shifting those challenges from the end user to the CRO. However, outsourcing poses additional limitations, including lack of workflow control, unpredictable timelines and security issues. Ultimately, this reduces the amount of rapid iteration and refinement by the researcher since multiple *screen-design-build-test* cycles are often needed to optimize the synthesized DNA or mRNA.

Key limitations within the build phase of the synthetic biology paradigm lengthen time to market for a wide array of innovative products within the healthcare, consumer, agriculture and technology markets. Build iterations can take days, weeks or months, depending on project type, using conventional methods with either in-house manual kit-based processes or by outsourcing portions of the project to a CRO. In either case, the key limitations of the build phase include the following:

- long project timelines resulting from non-scalable, manual processes, or the need to use multiple suppliers or CROs. The turn-around-times from CROs differ widely, and the process, depending on the complexity of the product ordered, ranges from days to months. Some CROs will not accept certain projects due to their inherent difficulty. In addition, there are fewer CROs that produce mRNA at scale and limited in-house kit solutions for generating synthetic mRNA starting from DNA sequences;
- inconsistent quality and performance resulting from supply chain constraints or the use of different kits if performed in-house, or resulting from using different CROs with inconsistent protocols;
- lack of data standardization across a project or organization which limits predictability and reproducibility;
- partial order fulfillment due to variations in project acceptance criteria, such as DNA sequence complexity;
- lack of workflow control and timing of project integration into parallel programs; and
- difficulty in controlling intellectual property and security concerns around sensitive DNA designs potentially becoming exposed to security vulnerabilities during transfer. Researchers would prefer to control their intellectual property, particularly within biopharmaceutical companies where hundreds of millions of dollars are spent on the development of proprietary DNA sequences.

Existing solutions for writing synthetic DNA and mRNA are insufficient.

The current processes for building synthetic DNA have several significant limitations including:

- inconsistent levels of fidelity of DNA fragments resulting from DNA synthesis errors, thereby reducing overall yields of usable material;
- inability to construct some stretches of DNA sequence that have particular features, such as extreme imbalances in nucleotide content (%G+C vs. %A+T) and repetitive sequences;
- inability to construct DNA sequences above a certain size; and
- inability to scale the material to a suitable yield such that it is usable in downstream applications.

The current processes for building synthetic mRNA have the same inherent limitations as building DNA since the construction of synthetic DNA is a prerequisite for making mRNA. In addition, there are several other key challenges including:

- the handling requirements of the mRNA products, which are highly unstable and susceptible to rapid degradation;
- the multi-step processes involved in producing purified, biologically active mRNA; and
- scaling the mRNA to high yields from DNA templates.

These limitations produce bottlenecks across the build phase, which have significantly hindered the ability of the synthetic biology paradigm to deliver on its full potential. This inefficiency has created a significant unmet need in the market for an approach that can automate, integrate, optimize and standardize the process, and thereby enhance the speed, predictability and reproducibility of the *screen-design-build-test* paradigm.

The Telesis Bio Solution

Our solution, which leverages our industry-standard Gibson Assembly method, is aimed at addressing the bottlenecks across the build phase in order to accelerate the *screen-design-build-test* paradigm. Key to our solution is our BioXp system, an end-to-end automated system for synthetic biology that fits on the benchtop and is broadly accessible due to its ease-of-use and hands-free automation. We have developed and commercialized two versions of the BioXp system, the BioXp 3250 system and the higher-capacity BioXp 9600 system. We believe our BioXp systems can democratize synthetic biology by making the build phase broadly accessible in terms of simplicity, accelerating applications and workflows, and greatly facilitating development of novel high-value products across a wide range of synthetic biology enabled markets. Our BioXp systems empower users to rapidly, accurately and reproducibly create high-quality synthetic DNA and mRNA that is ready for use in many downstream synthetic biology workflows.

Our solution is designed to offer the following benefits:

- *Consolidation of the build phase within a single end-to-end automated system:* We provide researchers all the hardware, software, materials and methodologies required to rapidly and accurately design and build large quantities of synthetic DNA and mRNA. Our BioXp systems reduce the turnaround time for such workflows to days or hours. Moreover, researchers no longer require multiple vendors to complete such workflows, eliminating related bottlenecks. We believe that using our BioXp systems save significant time and potentially accelerates time to market for critical products.
- *Increased speed and scale*: Our BioXp systems have the capacity to parallel process as many as 96 samples at once within an 8 to 24-hour period, depending on the BioXp system and kit being used. They also have the capacity to generate high quality and diverse libraries with short lead times, allowing innovation to be maintained in-house.
- *Capacity to construct a wide array of product formats*: Our BioXp systems were designed such that future applications would not require hardware upgrades but only software upgrades that could be installed remotely. This feature has facilitated new product development efforts to enhance current product specifications and to develop new kits that extend beyond the production of synthetic DNA. For example, since the BioXp systems were launched, new scripts have been developed to produce larger gene products, cell-free amplification of cloned DNA, and production of synthetic mRNA. Likewise, new scripts are currently being developed to enhance the mRNA product offering, allow for new entry points into the workflow, and to prepare NGS libraries for DNA sequencing. This capability provides substantial time-to-product and workflow control advantages for customers and gives them the flexibility to select the workflows that meet their unique needs.
- *Ability to construct larger and more complex DNA and mRNA sequences*: Our BioXp systems use proprietary protocols developed for robust DNA synthesis, assembly, and cloning enabling the construction of genes, mRNA, and clones across a wide range of sizes and complexity.
- *Industry-leading quality and performance*: Our BioXp systems use a proprietary two-step error correction process to generate high-quality synthetic genes every time. When compared to certain of our competitors, we have observed a 2.74 fold increase in sequence precision.
- *Enhanced productivity*: Our BioXp systems create finished DNA products in as few as eight hours. In addition, it includes protocols for the cell-free amplification of cloned DNA, obviating the need to use *E. coli*, reducing the time to product by days or even weeks. Altogether, we believe that this could represent at least a 20-fold productivity increase through accelerated iterations of the *screen-design-build-test* paradigm. Ultimately, product development cycles are accelerated because the desired biological results are identified more quickly.
- *Protection of proprietary vectors*: Our BioXp systems permit our customers to maintain their proprietary vectors on site, protecting their intellectual property throughout their entire development lifecycle.

- *Flexibility to use wider array of DNA to synthesize mRNA:* Our BioXp systems are enabled to allow a customer to "open" the system and use its own plasmid DNA to produce mRNA overnight with the push of a button.

Our Products

We have developed and commercialized products that include BioXp systems, BioXp kits for generating a wide array of synthetic DNA and mRNA formats, and benchtop reagents that complement the automated synthetic biology workflow applications and workflow solutions. We believe that the BioXp kits that we incorporate into our integrated system represent the industry's leading synthetic biology workflow automation solution. We believe our fully automated workflow solutions, coupled with our expanding menu of BioXp kits, will enable us to establish a first mover advantage in the rapidly growing synthetic biology market.

BioXp 3250 system

Our BioXp 3250 system was launched in September 2020, replacing the legacy BioXp 3200 system. We believe that it was the first commercially available fully automated benchtop instrument that enables numerous synthetic biology workflows by providing a turn-key, end-to-end solution for generating synthetic DNA and mRNA starting from DNA sequence. Through a combination of increased throughput and scale and reduced hands-on time, we estimate that the BioXp 3250 system offers the potential to significantly enhance productivity several fold, accelerating the development of critical new products in enabled markets. The BioXp 3250 system accelerates the *screen-design-build-test* phases of the customer's product development cycle by enabling rapid, automated synthesis of genes, clones, variant libraries and mRNA. Unlike traditional approaches that can take days, weeks or months, the BioXp 3250 system achieves these workflows in a single run, which can be completed in 8 to 24 hours

Figure 2: BioXp 3250 system

The BioXp 3250 system has the capacity to build 32 gene-fragments of up to 1.8 kilobase pairs (kb) in length or eight fragments of up to 7.2 kb in length and has a selection of off-the-shelf vectors, as well as the ability to bypass plasmid preps. It allows users to clone single or multiple genes into our, or customer-provided, vectors. In addition, it permits the synthesis of transfection-ready DNA quantities, variant libraries up to 800 bp in length in as few as 8 hours, exclusive of shipping time, and biologically active synthetic mRNA in as few as 24 hours, exclusive of shipping time.

Additionally, the BioXp 3250 system's ability to provide on-deck custom cloning obviates the need for subcloning or out-sourcing development of proprietary vectors to CROs allowing laboratories to maintain complete control of intellectual property relating to their proprietary vectors.

BioXp 9600 system

In September 2022, we released our BioXp 9600 system. We believe this fully automated, high-throughput benchtop instrument for synthetic biology workflows can enable scientists to overcome inefficiencies in their workflows which limit their discovery.

This next-generation high-throughput platform is designed to revolutionize synthetic biology workflows and further accelerates the *screen-design-build-test* process of research and discovery by building biology overnight and at the push of a button. The fully-automated BioXp system enables scientists to overcome process limitations created by the turnaround time, cost or complexity of

alternative means of building or acquiring DNA and mRNA. The BioXp system provides overnight, automated synthesis of genes, clones, DNA libraries and mRNA, enabling users to more tightly integrate screen, design and build cycles, driving greater productivity and reducing time to answer.

Figure 3: BioXp 9600 system

Commercialized kits for the BioXp 3250 system and the BioXp 9600 system

BioXp de novo kits contain all the requisite Gibson Assembly branded reagents and allow our BioXp system to perform the steps required to produce various DNA and mRNA products designed for a range of synthetic biology applications.

- BioXp de novo DNA fragment synthesis kit. Contains all the Gibson Assembly reagents necessary to make error-corrected, de novo synthetic genes of up to 1.8 kb in length.
- BioXp de novo DNA cloning kit. Contains all the Gibson Assembly reagents necessary to make error-corrected, *de novo* synthetic genes of up to 7.2 kb in length using a standard made-to-stock vector.
- BioXp de novo DNA cloning and amplification kits. Allow users to submit a digital sequence for the generation of linear DNA fragments, clones of interest, and to generate isothermally amplified DNA.
- BioXp Select DNA cloning and amplification kits. Contains reagents for the generation of clones of interest and isothermal amplification of cloned DNA starting from user-provided linear DNA fragments
- BioXp Select plasmid amplification kits. Contains reagents for isothermal amplification of plasmid DNA.
- BioXp de novo DNA library synthesis kit (site saturation scanning). Libraries with specific mutations distributed over the sequence space to achieve the desired diversity.
- BioXp de novo DNA library synthesis kit (alanine scanning). Libraries with varied single, contiguous amino acid sites, including site-saturation and alanine scanning libraries.
- BioXp de novo DNA library synthesis kit (combinatorial). Libraries with varied, multiple non-contiguous amino acids sites using degenerate bases to optimize protein binding and function.
- BioXp de novo mRNA synthesis kit. Contains all the Gibson Assembly reagents necessary to make biologically active synthetic mRNA samples using *de novo* synthesized, error-corrected gene fragments (mRNA template) of up to 1.8 kb in length.
- BioXp Select mRNA synthesis kit. Enables customers to synthesize purified capped and tailed mRNA between 0.4-10kb. The kit contains all the necessary reagents for on-demand synthesis of mRNA using a linear DNA template generated with a plasmid or PCR product for transcription.
- BioXp Select DNA cloning kits, Gibson Assembly. Off-the-shelf Gibson Assembly cloning kits enable automated cloning of user-provided fragments into a user-provided vector backbone in a single run on the BioXp platform. These kits contain all of the reagents necessary to generate circularized double-stranded DNA plasmids from input DNA fragments on demand.
- BioXp Select DNA cloning kits, Golden Gate Assembly. Off-the-shelf Golden Gate assembly cloning kits enable automated cloning of user-provided fragments into a user-provided vector backbone using two of the most popular Type IIS restriction enzymes, BsaI & BsmbI, in a single run on the BioXp platform. These kits contain the necessary reagents to generate circularized double-stranded DNA plasmids from input DNA fragments on demand.

- BioXp NGS Library Prep Kit for Whole Genome Sequencing. Designed specifically for use with the BioXp automated molecular biology workstation, this cutting-edge kit ensures that researchers can achieve faster results, significant cost reductions, and straightforward access to whole genome sequencing, facilitating comprehensive genomic analysis.
- BioXp NGS Library Prep kit for Plasmid Sequencing. Provides a specialized solution that enables automated and efficient library preparation for plasmid sequencing to ensure confidence in the full plasmid sequence. This kit streamlines the plasmid sequencing process, reducing hands-on time and minimizing potential errors.

By incorporating these application-specific BioXp kits into our BioXp systems, we are able to provide simple, push-button, walkaway, end-to-end automation of important synthetic biology workflows. We believe our products enable unrivalled time-to-product, quality, and workflow control advantages for our customers.

Gibson SOLA DNA Synthesis Platform

Gibson SOLA ushers in a new era of synthetic biology, enhancing the critical build phase to accelerate the screen-design-build-test cycle essential in the current landscape of research. Central to Gibson SOLA's advancement is its suite of build-to-stock enzymatic DNA assembly kits and bioinformatic tools, tailored to work in concert with a range of industry-leading hardware platforms. This integration results in the production of high-fidelity DNA and mRNA sequences. Engineered for high throughput and user-friendliness, Gibson SOLA enables automated, efficient operations directly within the customer's lab. This development advances enzymatic DNA synthesis, making sophisticated techniques more attainable and simplifying the build phase to expedite development timelines.

- Interoperability and Flexibility: Gibson SOLA's groundbreaking technology is designed for versatility, with a platform-agnostic approach that allows for seamless integration across various hardware systems. This interoperability ensures that Gibson SOLA can be implemented within a range of laboratory environments, accommodating diverse research and production needs while still delivering on its promise of superior quality and efficiency.
- Speed and Scale: Capitalizing on the foundation laid by the BioXp systems, Gibson SOLA enhances throughput and reduces synthesis times, offering unparalleled speed without compromising on the scale of operations. This means that Gibson SOLA can deliver high-quality output at a pace that sets a new industry benchmark.
- Product Format Diversity: Gibson SOLA's advanced design is adaptable for an array of product formats through software updates alone, showcasing our commitment to innovation without necessitating hardware upgrades. This adaptability positions Gibson SOLA at the forefront of new product development and offers our customers a versatile platform for a variety of applications.
- Complex DNA and mRNA Construction: With Gibson SOLA, the construction of complex genes and mRNA sequences is more efficient due to its enhanced native quality that exceeds the capabilities of the BioXp systems. Gibson SOLA uses our latest proprietary protocols for robust DNA synthesis and assembly, enabling the construction of a wide range of sizes and complexities with unprecedented precision. Unlike other technologies Gibson SOLA is compatible with pre-built customer supplied sequences such as PolyA and UTRs.
- Enhanced Productivity: Gibson SOLA's streamlined workflow substantially increases productivity by delivering finished DNA products in record time. This efficiency gain is a quantum leap from the BioXp system, facilitating a 20-fold increase in productivity and accelerating product development cycles dramatically.

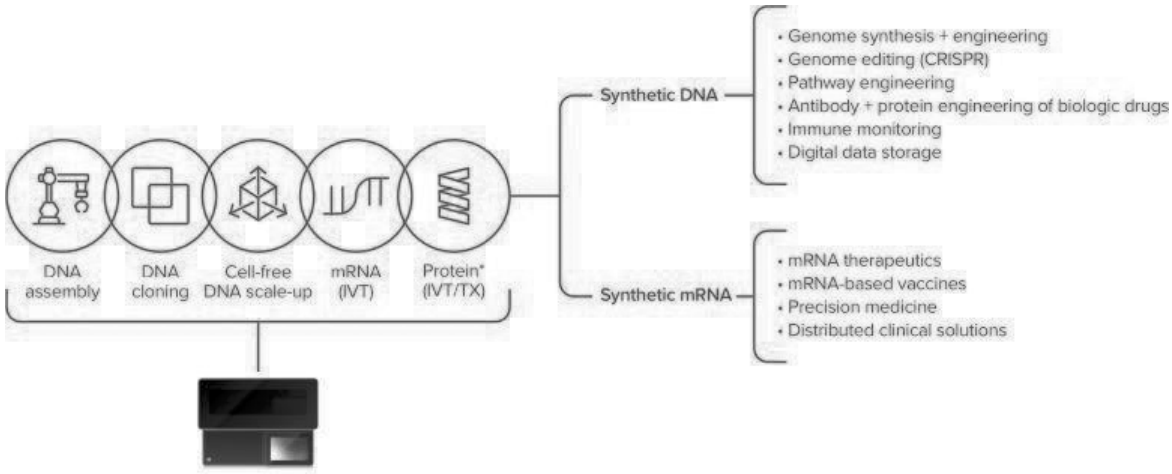
Our benchtop reagent

We also offer benchtop reagents that are synergistic with our BioXp systems and BioXp kits to accelerate the build phase of the *screen-design-build-test* synthetic biology paradigm. Our Gibson Assembly HiFi and Ultra kit contains all the reagents necessary to simultaneously assemble as many as 10 DNA fragments into a vector to produce a final product that is several hundred kilobase pairs in length.

Workflow Solutions for Synthetic Biology Enabled Markets

Our BioXp systems are intended to address the needs of the synthetic biology customer across discovery and pre-clinical development by providing an unmatched capability to synthesize high-quality DNA in as few as 8 hours and mRNA in less than 24 hours, exclusive of shipment times. With future system releases and extensions, we plan to address the continuum of research needs across the central dogma of molecular biology by enabling cell-free production of high-quality synthetic DNA, mRNA and protein for the discovery, development and manufacturing of enabled products across a wide range of markets.

Figure 4: Our automated DNA and mRNA solutions for synthetic biology enabled workflows



We are strategically focused on providing workflow solutions for markets with high-value enabled products such as those in healthcare and technology. These solutions are all based on our core portfolio of BioXp kits. Specific design software and BioXp kits (e.g., oligonucleotides) are employed depending on the desired enabled product. The appropriate application-specific BioXp kits are inserted into the BioXp system to perform the workflow solution tailored to meet the needs of the customer.

We target high-value application workflows within the synthetic biology-enabled markets. Key workflow examples are described below.

Synthetic DNA Application Workflows

We believe that with the BioXp system, scientists can perform rapid, high-throughput gene synthesis, regardless of vector size and complexity in a hands-free, automated fashion in 8 to 24 hours, exclusive of shipment times. We believe that our BioXp system offers a comprehensive value proposition that includes reduced turnaround time, increased throughput and scale, enhanced quality, complete workflow control and both synthetic DNA and mRNA formats. Our solutions allow customers to save time, improve scale and throughput and improve productivity for many synthetic biology enabled research and development workflows across multiple market segments, including the following:

1. *Synthetic DNA for genome synthesis and engineering*. DNA synthesis has become a fundamental tool throughout genetic research with increasing demand from scientists who are continuously looking to incorporate synthetic DNA into new cell-based discovery and production workflows. Addressing this growing demand requires the ability to quickly make large high-quality DNA molecules comprising entire gene sequences. Traditional molecular cloning and gene editing steps are tedious, manual in nature and require cellular transformation, which can take three to four weeks. Moreover, in addition to being time-consuming, classic genome engineering and DNA assembly techniques are limited in the size and complexity of constructs that can be engineered.

BioXp system benefits: Overall, our automated workflow solution allows users to: (1) engineer genomes and vaccine scaffolds that were previously inaccessible due to size, complexity and resource limitations; (2) engineer fully-synthetic genomes lacking pathogenicity through rational redesign; and (3) rapidly pursue research and development of emerging strains or modify existing genomic constructs based on experimental results. Our BioXp system overcomes these barriers and enables rapid synthesis within days to weeks, as well as the ability to modify large constructs and full-length genomes.

2. *Synthetic DNA for metabolic pathway engineering*. Metabolic engineering involves reconstructing and optimizing biosynthetic pathways in model organisms, creating robust "cellular factories" designed to carry out a specific task. Pathway modifications typically rely on recombinant or novel genes or gene circuits. Using recombinant or novel genes or gene circuits, metabolic pathways are modified or introduced into genomes of microbe hosts like *E. coli* or yeast. These genetically engineered hosts are routinely employed to more effectively produce valuable biomolecules for a variety of biomedical, industrial and research applications.

BioX*p system benefits*: With the gene synthesis capabilities of our BioXp system and the complex genetic circuitry made possible with Gibson Assembly technology, we are able to improve the speed and accuracy of metabolic engineering for even the most complex genetic circuitry.

3. *Synthetic DNA for antibody and protein engineering of biologic drugs*. Biologics-based (e.g., antibody or protein) discovery of novel therapeutics is one of the most important areas of research for improving medical advances through engineering of antibodies or other proteins for cancer treatment, infectious diseases and inflammatory or autoimmune disorders. Monoclonal antibodies, antibody-drug conjugates, single-domain antibody variants, chimeric antigen receptor T cells (CAR-Ts) and T cell receptors (TCRs) have become invaluable therapies due to their robust recognition of targets and relatively lower side effects compared to traditional small molecule therapies.

Desirable properties for therapeutic antibody products include high antigen-binding affinity, specificity, low immunogenicity, solubility, stability, manufacturability and adequate pharmacokinetics. Researchers involved in biologics discovery and antibody and protein engineering often leverage DNA variant library screening as an essential step in the discovery workflow. A major constraint in antibody discovery has been long lead times associated with sourcing custom-built DNA libraries used to screen new antibody variants.

Customers are increasingly using our BioXp kits for variant libraries to accelerate the *screen-design-build-test* phases for their antibody screening and optimizations stages. Specifically, we believe that utilizing libraries on the BioXp system across library synthesis, affinity maturation and codon optimization workflows accelerates research by improving productivity and reducing the time and costs associated with certain drug discovery and development programs. Additionally, we believe, with our broad menu and wide selection of library types, including combinatorial, scanning and custom libraries, we provide flexibility in antibody screening and optimization analysis to serve different needs (e.g., stability, epitope optimization) at various points in the workflow. Furthermore, these libraries are synthesized with our proprietary error-correction technology, resulting in high-fidelity genes.

Protein engineering is another synthetic biology enabled workflow of significant importance and caters to the growing need for improved enzymes and bioproducts for industrial production. Enzyme engineering typically begins with research to find a candidate with the best starting properties to use as a template followed by engineering cycles to find enzymes with enhanced properties.

After enzyme discovery, the build phase involves iterative rounds of library synthesis with an improved variant from the previous round selected as the template for the subsequent round. Subsequent build phase construction is rate limiting because of its sequential nature: design iterations cannot be conducted in parallel because the output from the previous phase is required as input for the next phase. Finding ways to shorten the time in this phase is key to reducing the overall project timeline. A second consideration is the burden of screening. Library synthesis can generate thousands or even hundreds of thousands of variants that must be screened to identify beneficial ones. Limiting the number of variants with a rational approach to library design combined with an automation system that amplifies and assembles constructs with high fidelity is a key strategy to minimizing project timelines while also maximizing the probability of identifying the most beneficial variants in an unbiased manner.

BioXp system benefits: Our BioXp system provides an accelerated path for antibody and pathway engineering workflows and compared to comparable competing services, we estimate a reduction in build phase time by over 70%. A key part of the accelerated timeline is the BioXp system's ability to deliver up to 96 libraries in 8 to 24 hours once the reagents are received, compared to the traditional method, which, depending on the method used, can take days or weeks. We believe adopting the BioXp system into the antibody or protein engineering workflow often results in the increased generation of validated leads.

4. *Immune monitoring*. Immune monitoring for patients receiving cancer immunotherapy is vital for understanding the process and efficacy throughout the course of the treatment. Characterizing the immune status for insights into the therapy's potential is essential, particularly in patients who are receiving novel immune-modulating therapies. Speed and efficiency of immune assays allow for real-time feedback and the ability to be agile in a patient's treatment regimen.

BioXp system benefits: The BioXp system's high-throughput gene synthesis and flexible cloning modalities allow for quick screening and design of novel chimeric antigen receptors (CARs), engineered TCRs, and artificial transcription factors. Different CAR designs can therefore be investigated to enhance their tumor specificity or to fine-tune T cell activity. Further, the development of novel gene circuits or CARs to increase effectiveness of CAR-T therapy by engineering T cell mobility or mitigating immunosuppressive cues in the cancer microenvironment can help drive improved efficacy.

Synthetic mRNA Application Workflows

With the BioXp systems, scientists can perform rapid, high-throughput synthesis of biologically active mRNA in a hands-off, automated fashion within 24 hours once the reagents are received. Our BioXp systems are able to fully automate mRNA synthesis for the research market and offers what we believe to be a comprehensive value proposition that includes reduced turnaround time from weeks to days, enhanced quality and complete workflow control. Our solutions allow customers to address many target applications across multiple market segments.

1. *Synthetic mRNA for infectious disease vaccine discovery and development*. The need for rapid vaccine development in response to emerging pathogens has become increasingly clear during the COVID-19 pandemic. However, vaccine manufacturing is consistently complicated for manufacturers, regulators and public health officials, especially for endemic viruses (e.g., influenza), where manufacturers must adjust the vaccine to counter the virus' constant antigenic variation. To start a new influenza vaccine manufacturing campaign, a key material, the vaccine seed virus, must be changed frequently to match circulating strains in order to track the virus' antigenic evolution. The existing systems for accomplishing vaccine strain changes have required the shipment of viruses and other biological materials around the globe, which have caused delays in vaccine availability. Existing systems have also used legacy techniques such as egg-based virus cultivation, resulting in vaccine mismatches.

In comparison, mRNA vaccine production is simple, cost-effective and can be easily adapted to accommodate new candidates within an established manufacturing pipeline. Given this, vaccinology has recently seen a shift toward synthetic mRNA approaches, which allow for rapid, scalable and cell-free manufacturing of prophylactic and therapeutic vaccines. For development of mRNA vaccines, *de novo* gene synthesis allows for increased specificity of antigen proteins, more efficient vaccine adjuvants, and safer specialized vectors. Through codon-optimization of these genes and vectors, targeted and safe vaccines can be created rapidly to treat newly emerging viral threats, such as influenza, coronaviruses and Ebola.

Gene synthesis with codon-optimization and mutant libraries using the BioXp system is designed to accelerate the speed of vaccine development by improving the efficacy and safety of the resulting recombinant genes, adjuvants and vectors. Also, pairing antigen epitope mapping technology with the BioXp system's ability to rapidly iterate is accelerating rational design strategies for vaccine development.

BioXp system benefits: We believe our end-to-end solution for the rapid and accurate production of cell free synthetic DNA and mRNA, when combined with our BioXp protein kit that is currently in development, positions the BioXp system for rapid adoption within high-growth vaccine and therapeutic markets, as it allows for the acceleration of product development cycles by addressing critical bottlenecks. This is especially important for infectious disease vaccine development, such as for influenza, where the key bottleneck is the lack of quick strain *screen-design-build-test* cycles close to flu season that makes vaccine response unpredictable.

2. *mRNA-based vaccines for precision medicine*. Neoantigens, or tumor mutated specific antigens, are major tumor rejection antigens, allowing tumors to activate the immune system and induce an efficient anti-tumor response. As personalized medicine for cancer therapeutics ramps up and becomes more feasible and affordable, individual patient neoantigen development is increasingly important. Identification of these neoantigens has greatly improved with recent advancements in deep sequencing and bioinformatics technologies. Gene synthesis and mRNA production then allow for these predicted neoantigens to be synthesized and tested for T cell reactivity, differentiating true immunogenic neoepitopes from putative ones. Since patients' mutated antigens are largely unique to the individual, speed is one of the most important goals in identifying and verifying true neoantigens for induction of the T cell-mediated immune response.

BioXp system benefits: The BioXp system's on demand high-throughput gene and mRNA synthesis and flexible cloning into a variety of vectors allow for quick screening and development of the best personalized cancer treatments. In addition, our cell-free amplification process avoids the use of *E. coli*, thus eliminating endotoxin contamination and unwanted immunogenicity.

3. *mRNA-based therapeutics*. With COVID-19 vaccines leading the way, mRNA has become one of the more promising classes of therapeutics and is being validated by key industry players (e.g., Avantor, Inc., Moderna, Inc., and Maravai LifeSciences Holdings, Inc.) and emerging mRNA delivery companies (Precision NanoSystems Inc., Nutcracker Therapeutics, Inc.). Monoclonal antibody-based drugs require complex production and purification processes and aberrant post-translational modifications of the antibody are a problem. An mRNA-based approach is a possible solution, whereby the genetic information of the antibody, not the antibody itself, is delivered. Transient gene transfer aims at administering the mAb-encoding nucleotide sequences in DNA or mRNA form, rather than the mAb protein itself, directly to patients. This allows for the *in situ* production of biologicals in a cost- and labor-effective manner, potentially for a prolonged period of time. Although past research has been mainly focused on the development of plasmid DNA, the limitations associated with these "classical" approaches and the recent improvements in stability and translatability of *in vitro* transcribed (IVT) mRNA have recently led to an increased interest in mRNA as a delivery vector. In addition to safer pharmaceutical properties, such as no risk of genome integration, the transient expression of mRNA-encoded antibodies enables a more controlled exposure, with more protein production during peak expression compared to plasmid DNA.

BioXp system benefits: Our BioXp system can be used to rapidly produce small-scale, biologically active mRNA for accelerated iteration of the *screen-design-build-test* paradigm for the identification of therapeutic candidates. In addition, a wide menu of on demand automated library synthesis enables the customer to further speed up iterative *screen-design-build-test* paradigm during the drug discovery and development continuum. When library synthesis is used in combination with mRNA production, we estimate that

a customer can reduce turnaround times by weeks or months when using the BioXp system for screening and optimizing the mRNA products that have the most desirable pharmaceutical properties.

4. CleanCap technology benefits: In July 2021, we signed a licensing and supply agreement with TriLink Biotechnologies, part of Maravai LifeSciences Holdings, Inc., for its industry-leading CleanCap technology. We integrated the mRNA capping technology into our suite of automated mRNA synthesis kits for the BioXp system. Together, the technologies are expected to increase productivity and yields for mRNA synthesis workflows, potentially opening the doors for a broader range of downstream therapeutic and vaccine applications.

Our Technology

Our systems are powered by many key innovations that provide unparalleled capabilities, notably:

Gene synthesis

Our robust gene synthesis process is proprietary and enables the simultaneous assembly of hundreds of oligonucleotide pools of up to several thousand kilobase pairs in length, including a wide range of complexity (e.g., 20-70% GC content, repetitive DNA sequence). Our proprietary error-correction process produces high-quality synthetic DNA sequences from beginning to end. BioXp gene synthesis kits leverage this proprietary gene synthesis technology, which involves:

- the design of single-stranded oligonucleotide sequences comprising a DNA sequence, and novel chemistry and thermal cycling parameters for the robust assembly of those chemically synthesized oligonucleotides into long double-stranded DNA products; and
- a two-step error-correction process where error-containing DNA products are removed through a combination of a mismatch-specific endonuclease working in concert with an exonuclease.

In the final step, only error-free genes are amplified by PCR resulting in high yields of error-free DNA. Because all applications currently rely on gene synthesis, this technology is used within every BioXp kit. We have also developed a second proprietary gene synthesis process that uses ultra-short oligonucleotides that assemble into high-fidelity synthetic genes without enzymatic error correction procedures.

mRNA synthesis

Our proprietary mRNA synthesis process is at the forefront of innovation, enabling the simultaneous assembly of various mRNA sequences that can range widely in length and complexity, tailored to meet specific research needs. This process adeptly handles sequences with diverse GC contents and sophisticated secondary structures. Our stringent error-correction methods guarantee the generation of high-quality mRNA from start to finish. The mRNA synthesis kits for our BioXp system are a testament to this proprietary technology, which involves:

- designing oligonucleotide templates that not only encode the desired protein but also incorporate essential regulatory elements, including 5’ and 3’ untranslated regions (UTRs), cap sequences, and poly(A) tails. This process employs optimized chemistry and thermal cycling to facilitate accurate transcription into complete mRNA strands;
- a purification step that ensures the removal of incomplete or erroneous transcripts. This refinement step is crucial for achieving a product of the highest purity and functionality; and
- the production of capped and polyadenylated mRNA, ensuring the molecules are fully prepared for efficient translation. The resulting high yield of purified mRNA is optimized for various applications, including therapeutic developments and vaccine research. Our BioXp system streamlines this process, making it accessible for both rapid prototyping and high-throughput production.

Library synthesis

Our robust gene synthesis technology enables the construction of several DNA variant library types including:

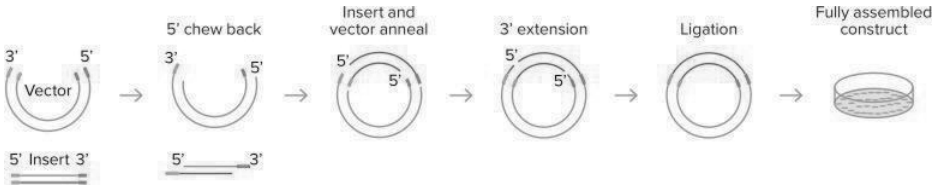
- scanning libraries with varied single, contiguous amino acid sites, including site-saturation and alanine scanning libraries;
- combinatorial libraries with varied, multiple non-contiguous amino acids sites using degenerate bases to optimize protein binding and function; and
- targeted libraries, with specific mutations distributed over the sequence space to achieve the desired diversity.

Our library synthesis technologies are powerful tools for manipulating protein structures for optimization studies in biologics discovery, protein engineering and several other disciplines. This technology is included in our BioXp library kits and enables the BioXp systems to generate as many as 96 libraries per instrument in a single 8 hour run, with each library containing an amino acid diversity as high as 10 to the 10th power.

DNA cloning

Our robust molecular cloning method is proprietary and commonly referred to as Gibson Assembly across the industry. The method can simultaneously combine as many as 10 DNA fragments based on sequence identity. It requires that the DNA fragments contain approximately 20 to 40 base pair overlaps with adjacent DNA fragments. These DNA fragments are mixed with a cocktail of three enzymes, along with buffer components. The three required enzyme activities are: exonuclease, DNA polymerase, and DNA ligase. The exonuclease splits DNA from one of its ends resulting in single-stranded regions on adjacent DNA fragments, which can anneal to each other. The DNA polymerase incorporates nucleotides to fill in any gaps. The DNA ligase covalently joins the DNA of adjacent segments, thereby removing any imperfections in the DNA. The resulting product is different DNA fragments joined into one. Either linear or closed circular molecules can be assembled. With over 6,000 citations in scientific literature, Gibson Assembly is one of the most widely-used molecular cloning methods used to create recombinant DNA. It is named after its creator, Dr. Daniel Gibson, who is our Chief Technology Officer and co-founder. We believe that the Gibson Assembly method can be used to rapidly clone multiple DNA fragments into any vector in one hour or less without the use of restriction enzymes.

Figure 5: Gibson Assembly technologies for DNA assembly



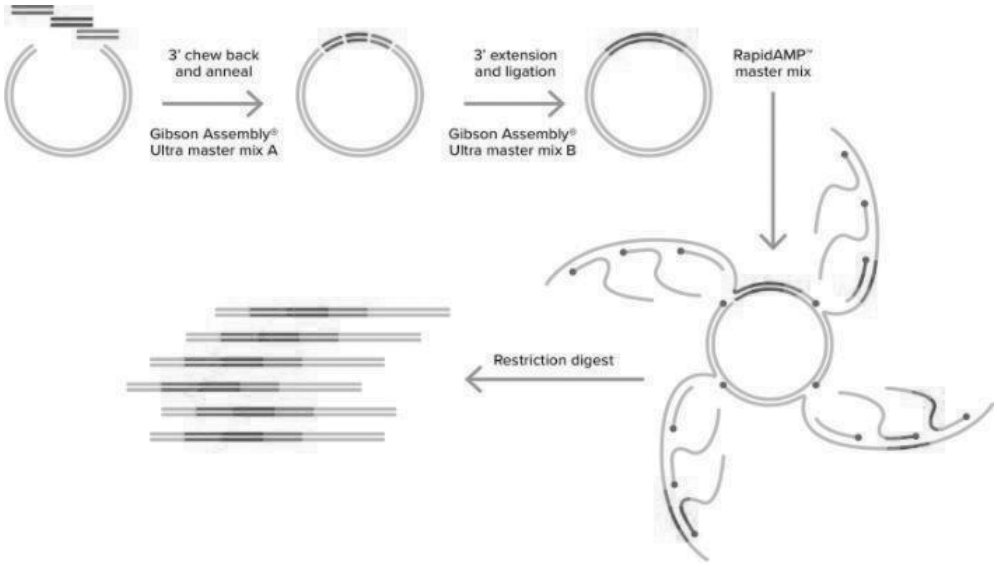
The BioXp cloning kits leverage Gibson Assembly in a proprietary fashion to bring together up to four gene fragments in up to four vectors, permitting larger DNA to be constructed and providing increased flexibility in cloning strategies. Multi-fragment assembly and cloning on the BioXp system gives customers the power to design, build, test and iterate genes more rapidly.

Cell-free amplification of cloned DNA

The Gibson Assembly process generates circular products that are permanently sealed by DNA ligase. We have taken advantage of these two essential features to develop a proprietary cell-free amplification process that combines our Gibson Assembly technology with components of the well-established rolling circle amplification (RCA) technology. Once the Gibson Assembly reactions are complete, reaction products are incubated for several hours in a mixture containing a DNA polymerase and random hexamers. The BioXp cell-free DNA amplification kit allows users to assemble and amplify constructs to achieve transfection-ready DNA in a single day. With this technology, high-quality, high-fidelity DNA can be rapidly produced, all while eliminating tedious tasks associated with transformation, cell culture and *E. coli* harvest. Cell-free DNA amplification kits are available as an automated cell-free amplification solution for the BioXp system. Benefits include:

- accelerated screen-design-build-test cycles;
- endotoxin-free DNA products;
- an alternative to amplification strategies that fail due to biological reasons within host organisms; and
- propagation of DNA without unwanted vector elements.

Figure 6: Gibson method for cell-free DNA production



System engineering and automation

The BioXp systems contain fluid processing and precise thermal control to run all applications, including the synthesis and scale-up of DNA and mRNA. The proprietary and highly reliable automation components of the BioXp system include patented thermalcycler technology and sample handling and sealing devices. Significant software development has resulted in an easy-to-use interface with robust diagnostics and error detection as well as remote access capability to quickly address any issues. Key features of the BioXp systems include:

- a high precision patented thermalcycler for precise control of thermal cycling parameters;
- a high precision fluid handling system for accurate transfer and mixing of reagents;
- a high reliability 5-axis motion control system for accurate positioning;
- an integrated camera system for confirmation of proper loading and reading barcodes on the components of BioXp kits;
- a touchscreen interface and integrated computer processor, which allows for simple, intuitive operation;
- internet connectivity enabling custom scripts to be loaded for each customer's needs, post-run data to be retrieved and remote service/updates to be performed;
- a proprietary sample handling system that allows movement of samples throughout the process; and
- a flexible system design that anticipates development of new protocols to continue collapsing customer workflows.

Cloud-based design and analytics

The BioXp portal includes design tools used to break down desired DNA sequences into building blocks sent to the user, ultimately to be synthesized and assembled on the BioXp system. Our predictive modeling of the complexity and level of difficulty ensures that the probability of success in building a DNA sequence is greater than 98%. The co-development process by our biologists and engineers has resulted in a proprietary combination of synthetic biology and automation. The BioXp system is highly flexible and is controlled by processing information from the cloud, tailored for a user's specific application. There is no need for the user to develop custom processing scripts or modify parameters because our ordering software and associated BioXp barcodes ensure that the desired application is processed.

Large and complex DNA synthesis up to complete genomes

Our gene synthesis technology in combination with the Gibson Assembly cloning process is what enables us to excel in the automated synthesis and engineering of large and complex DNA constructs. Our proprietary tools combine novel DNA design, synthesis and assembly techniques to manufacture long DNA constructs, including the synthesis of a complete genome or chromosome. Using these technologies, our team has chemically synthesized several bacterial and viral genomes, including some of the largest chemically-defined structures ever synthesized in a laboratory.

The final genetic constructs required to develop many commercial applications are longer than those that can be readily synthesized using standard industry techniques. While a simple sequence of genes may be several thousand base pairs long, the genomes of many bacteria may be up to several million base pairs long, while the genomes of some viruses can exceed one million base pairs in length. Traditional DNA synthesis and assembly approaches are not practical for synthesizing genomes of that length.

Research and Development

Our research and development team has been at the forefront of discovery and development of synthetic biology workflows for over 18 years, including more than 10 years of experience automating many of those processes. We believe that this experience gives us industry-leading know-how, intellectual property and time-to-market advantages with respect to new products. We have specific and valuable experience and knowledge related to problem solving and have a deep knowledge of applicable synthetic biology research and development methodologies. We have particularly strong technical core competencies related to constructing large and complex strands of DNA and automating synthetic biology applications across multiple end-to-end workflows.

The overarching goals of our research and development programs are to continue to bring new technologies to market that address the most pressing questions in synthetic biology solutions. Our research and development department hosts the key proprietary synthetic biology tools and technologies, with applications across a wide variety of industries, sponsors research and development efforts to apply those tools and develops new opportunities. To this end, we plan to focus our research and development efforts on the following areas:

- *Strategic partnerships*: We focus partnering efforts in the areas of mRNA vaccines, biologics discovery and cell engineering validating our technology systems.
- *New capabilities and solutions for our current BioXp systems*: We continue to expand the applications and workflows available on our BioXp platform to bring increased utility and value to our customers. We are developing workflows and reagent kits for the BioXp, branded as BioXp Select, that will allow customers to start with plasmid and linear DNA from other sources and perform cloning, cell-free amplification, and mRNA synthesis on our platform.
- *New custom workflow solution-focused products*: We are commercializing our Gibson SOLA enzymatic DNA synthesis technology onto a variety of commercially available automation platforms to enable fully customized on-premise solutions for rapid synthesis of DNA, RNA and proteins. These solutions will enable on-demand sequence-to-construct capabilities at large-scale to enable customers to significantly accelerate their screen and discovery workflows.

As of December 31, 2023, we employed 16 employees in R&D, primarily located in San Diego, California. The R&D team consists of two groups, a scientific team and an engineering team, with 11 and 5 employees, respectively.

- ***Scientific Team***: Eleven experienced scientists, approximately 55% of whom hold a Master's degree and 55% of whom hold a Ph.D. The majority of the scientists are molecular biologists with vast experience in building new technologies related to benchtop and automation procedures for DNA sequencing and synthetic biology workflows. The team is led by Dr. Daniel Gibson, who is responsible for some of the foundational discoveries in synthetic biology, including the Gibson Assembly method
- ***Engineering Team***: Five personnel with expertise in software, fluidics, mechanical, electrical and embedded firmware development in both RUO and good manufacturing practice (GMP) environments. The team has decades of experience in applications of state-of-the-art engineering designs and solving complex systems for laboratory and medical devices. They are experts in translating the latest molecular biology workflows into reliable, repeatable robotic fluid handling steps processed under precise temperature controls.

Manufacturing

We currently utilize single-source third parties for some components of our BioXp kits and benchtop reagents. We have identified a list of our single-source suppliers for key reagents and have begun to identify strategies for second-source supply. Having dual sources for certain of our raw materials will reduce the risk of a potential production delay caused by a disruption in the supply of

a critical raw material or component. Our mitigation plans for these single-source key reagents include maintaining six to 12 months of safety stock inventory on hand, as well as evaluating in-house production of some key reagents. For the key reagents where we cannot find a suitable second-source supplier, we plan to continue to maintain our six to 12 month safety stock inventory.

BioXp 3250 and BioXp 9600 system manufacturing is currently performed in-house at our main facility in San Diego, California. We maintain sufficient raw material inventory, trained staff, and equipment necessary to supply our needs based on forecast demand. We maintain a forecast that extends at least 12 months and periodically update that forecast to drive production and procurement activities. We perform all assembly and quality control testing of the BioXp 3250 and BioXp 9600 systems in-house at our facility in San Diego. Turnaround time for both the BioXp 3250 production is typically four weeks.

In 2023, we established an in-house oligonucleotide production facility that produces oligos for use in our BioXp de novo kit products. We currently have sufficient capacity to produce oligos necessary to cover at least 70% of our forecasted demand for the upcoming 12 months. In addition to our in-house capability, we maintain supply relationships with two external oligo suppliers, which we believe will enable us to meet any excess demand.

Reagent manufacturing and storage is completed within our headquarters in San Diego, California. All reagents are manufactured, quality-control tested and released to inventory by our quality assurance department certifying that our reagents meet our quality standards. We maintain safety stocks of key reagents in quantities that we believe mitigate the effects of any supply disruptions. Key components of the reagents are sourced from well-established third parties, most notably, IDT and Eurofins Scientific SE.

As of December 31, 2023, we had 70 employees dedicated to operations, with 60 supporting Eton service operations, 4 focused on reagent manufacturing, 3 focused on global logistics and supply chain, and 3 focused on DMT.

Commercial Operations

We commercially launched the BioXp 3250 system, BioXp kits with associated cloud-based application scripts, and benchtop reagent kits in September 2019. From the initial launch of our solution through December 31, 2023, we have launched a total of 21BioXp kits, three benchtop reagent kits, and several other synthetic biology products. We have placed approximately 300 BioXp systems globally. We target customers in the fields of personalized medicine, biologics drug discovery, vaccine development, genome editing and cell and gene therapy. As of December 31, 2023, our customer base was composed of approximately 500 customers and included 17 of the 25 largest biopharmaceutical companies in the world ranked by 2023 revenue. Our customer base also includes leading academic research institutions, government institutions, CROs and synthetic biology companies. One customer, Pfizer, Inc., accounted for 33% of our revenue for the year ended December 31, 2023, based on a Research and License Agreement.

As of December 31, 2023, we employed a commercial team of 24 employees, many with significant industry experience. Of the 24 commercial employees, 23 were in sales and 1 was in marketing. As of December 31, 2023, our commercial team included 20 quota carrying sales professionals spanning business development managers, inside sales and field application scientists. We employ a direct sales model in North America and four major European markets (United Kingdom, Germany, France and Benelux), while selling through more than 22 channel partners across Europe, the Middle East, Africa and Asia Pacific.

Our commercial team is focused on driving active placements of BioXp systems and maximizing their utilization at the most iterative, costly and time-consuming steps across our customers' workflows. Potential customers can gain access to our system via direct purchases, services offerings or through strategic partnerships.

To maximize our commercial reach, we have distribution agreements with international channel partners for our products. These agreements allow us to reach approximately 50 countries globally, with key focus on networks in Europe, the Middle East, Africa and Asia Pacific. We sell our products directly in the U.S., providing instrument field services through a hybrid of in-house and third party-contracted engineering support.

As of December 31, 2023, we employed a service and support team of 8 employees focused on delivering an outstanding customer experience.

Competition

Our market is characterized by highly competitive and dynamic products, rapid technological advancements and continually evolving customer demands. We face competition from core synthetic biology companies and the broader NGS space, such as Thermo Fisher Scientific Inc.; Danaher Corporation; Azenta; GenScript Biotech Corporation; SAS; Integrated DNA Technologies, Inc.;

Eurofins Scientific; Synthego Corporation; Molecular Assemblies, Inc.; Nuclera Nucleics Ltd; Nutcracker Therapeutics, Inc.; Twist Bioscience Corporation; Aldevron, LLC; TriLink BioTechnologies, Inc.; Evonetix Ltd.; Illumina, Inc.; Roche AG; and others. Our competitors and their products and services are focused on discrete steps across various synthetic biology applications including gene synthesis, enzymatic DNA synthesis, protein engineering, cell engineering, tools and automation, software, food and agriculture, materials, aquaculture, biopharmaceutical, health and others.

While our industry is composed of many companies offering services or discrete products, we believe there is a lack of an existing, comprehensive solution enabling end-to-end control of biologics and vaccine discovery and development workflows in-house.

Arrangements with Commercial and Governmental Entities

We believe that our technology is applicable to discovery and development in the following fields: vaccines, biologics, diagnostics, agriculture, animal health and food science. In the ordinary course of business, we enter into arrangements with commercial channel partners and others to maximize our commercial reach.

Early Access Collaboration and Licensing Agreement with Pfizer

In December 2021, we entered into a Research Collaboration and License Agreement (Pfizer Agreement) with Pfizer Inc. (Pfizer), pursuant to which we agreed to collaborate with Pfizer to further develop our novel enzymatic DNA synthesis technology for Pfizer's use in its research and development of mRNA-based vaccines and biotherapies. The financial terms of the deal include an upfront payment from Pfizer to us, along with success-based technical milestone payments that could be earned in the near term. We are also eligible to receive additional milestone payments based on the achievement of specified development, regulatory and commercialization goals associated with any products developed from the application of our technology developed and licensed under the agreement.

We granted Pfizer a non-exclusive, worldwide license to use our enzymatic DNA synthesis technology for purposes of researching, developing, manufacturing and commercializing pharmaceutical and biopharmaceutical products and a limited-time option to convert such license to exclusive for specific applications.

Under the Pfizer Agreement, Pfizer made an upfront payment to us of $8.0 million at the time of execution, a milestone payment of $2.5 million in 2022 as a result of successful completion of our first technical milestone and two additional milestone payments of $2.5 million each for completion of our second and third technical milestones under the same agreement. If we meet additional technical milestones defined in the Pfizer agreement, we will be eligible to receive one additional near-term milestone payment of $2.5 million.

In addition to the upfront payment and technical milestone payments, Pfizer has agreed to make milestone payments to us upon the products meeting certain clinical milestones, with each product (other than exclusive products) being eligible for milestone payments up to $20.0 million if that product were to meet the applicable clinical milestones and the first exclusive product in each exclusive field being eligible for milestone payments up to $55.0 million if that product were to meet the applicable clinical milestones. Pfizer has also agreed to pay us up to $60.0 million in sales milestones for products (other than exclusive products) if aggregate net sales of such products meet certain thresholds and up to $180.0 million in sales milestones for exclusive products if aggregate net sales of the exclusive products meet certain thresholds. Provided the Pfizer Agreement remains in place, Pfizer will also pay escalating royalties from a low to mid-fraction of one percent of net sales of all products. Pfizer's obligations to pay royalties with respect to a product within a country will expire after specific criteria including such product no longer being covered by patent rights licensed to Pfizer by us in such country. Royalty payments are subject to reduction after the introduction by a third party of a biosimilar product in such country.

Intellectual Property

Protection of our intellectual property is fundamental to the long-term success of our business and is an important commercial strategy. Like other companies in the life sciences industry, we seek to protect our significant technologies by pursuing and maintaining patent protection. We also seek to protect aspects of our business as confidential know-how and as trade secrets. Our commercial success depends in part upon our ability to obtain and maintain protection afforded by laws directed toward intellectual property rights, to defend and enforce these rights and to operate without infringing the intellectual property rights of others.

The patent positions for high-technology, life sciences companies like ours are generally uncertain and can involve complex legal, scientific and factual issues. Issued patents are subject to interpretation as to their scope and applicability, and that uncertainty is typically not resolved in whole or in party except in litigation. Patent applications involve even more uncertainty because the scope of

claims pending in a patent application may be significantly reduced or otherwise changed in order to obtain the grant of a patent. Moreover, even if granted, the scope, validity and enforceability of granted claims can be challenged in a variety of proceedings. Grounds for a validity challenge could be an alleged failure to meet any of several statutory requirements, including lack of novelty, obviousness or non-enablement. Grounds for an unenforceability assertion could be an allegation that someone connected with prosecution of the patent withheld relevant information from the relevant patent office, or made a misleading statement, during prosecution. Third parties may also raise similar claims before administrative bodies in the United States or abroad, outside of the context of litigation *per se*. Such mechanisms include *ex parte* re-examination, *inter partes* review, post-grant review, derivation and pre- and post-grant opposition proceedings.

As a result, we cannot guarantee that any of our products or technologies will be protected or remain protectable by enforceable patents. We cannot predict whether any particular patent application that we are currently pursuing in any particular jurisdiction will be granted as a patent or whether the claims of any patents we obtain will sufficiently exclude others from making, using or selling products or services in competition to us. Nor can we guarantee that third parties will not circumvent our patent claims by designing around them.

Changes in the patent laws or interpretation of the patent laws in the United States or in other jurisdictions could increase these uncertainties and the costs surrounding prosecution of patent applications and enforcement or defense of issued patents. For instance, under the Leahy-Smith America Invents Act (the America Invents Act), enacted in September 2011, the United States transitioned to a first inventor to file system in which, assuming that other requirements for patentability are met, the first inventor to file a patent application on a given invention is entitled to a patent on the invention regardless of whether a third party was the first to invent the claimed invention. The America Invents Act also provides for third-party submission of prior art to the USPTO during patent prosecution and additional procedures to challenge the validity of a patent after grant, including post-grant review and *inter partes* review. The America Invents Act and its implementation could increase the uncertainties and costs surrounding the prosecution of our patent applications and the enforcement or defense of our issued patents, all of which could have a material adverse effect on our business, financial condition, results of operations and prospects.

Furthermore, the courts have held that patent claims that recite laws of nature are not patent eligible, but patent claims that recite sufficient additional features that provide practical assurance that claimed processes are genuine inventive applications of those laws may be patent eligible. But what constitutes a "sufficient" additional feature is the subject of uncertainty. The USPTO has published and continues to revise and publish guidelines for patent examiners to apply when examining claims for patent eligibility as the case law continues to evolve. Patent eligibility is also an area of the law under continual development in other jurisdictions around the world.

In addition, U.S. Supreme Court rulings have narrowed the scope of patent protection available in certain circumstances and weakened the rights of patent owners in certain situations. In addition to increasing uncertainty with regard to our ability to obtain patents in the future, this combination of events has created uncertainty with respect to the value of patents, once obtained.

Our patent portfolio includes more than 300 pending or issued cases worldwide. The portfolio focuses on instruments, devices and methods for synthesizing and assembling high-fidelity DNA, while also including genome engineering and editing technologies. The instrument portfolio includes domestic (U.S.) and foreign patents for the BioXp and the DBC instruments, which allow users to synthesize DNA molecules of specific sequence from pre-synthesized oligonucleotides or directly from digital DNA sequence using nucleotides, thus allowing users to rapidly synthesize DNA molecules on demand in their own laboratory. Further protection is provided by method patents relating to molecular biology processes performed on the instruments, patents protecting a key instrument component and a bio-security component useable with the instruments to counter misuse. The DNA synthesis portfolio features the widely used Gibson Assembly® method, a staple method in DNA laboratories around the world that allows users to join multiple DNA fragments in a single reaction. The portfolio also includes patent applications for our enzymatic DNA synthesis technology, known as SOLA (short oligonucleotide ligation assembly).

Other highlights of the portfolio include a "watermarking" DNA data storage method for encoding human readable text conveying a non-genetic message into nucleic acid sequences. The portfolio also includes issued patents directed to "endotoxin free" *Vibrio* organisms that provide researchers with the ability to use the ultra-fast-growing *Vibrio natriegens* (Vmax) organism in research and production applications with reduced risks of endotoxin in the product. More recently filed patent applications relate to a technology focused on building DNA molecules of ultra-high fidelity suitable for synthetic biology applications, and a technology permitting users to synthesize any possible DNA sequence at high fidelity from a library having a limited number of oligonucleotide members.

The portfolio contains U.S. patents or allowed U.S. applications relating to the BioXp and DBC instruments, and our Gibson Assembly methods and several foreign patents relating to the BioXp systems and Gibson Assembly. The portfolio also contains U.S. patents or allowed U.S. applications relating to our fast-growing *Vibrio natriegens* host cell organisms and numerous granted foreign patents for our various DNA synthesis methods.

The portfolio includes patents and pending patent applications in three main technology areas of instrumentation, DNA synthesis and assembly and genome engineering, as follows:

Instrumentation

As of March 1, 2024, this section of the portfolio contains two issued U.S. patent applications relating to the BioXp and an issued U.S. patent for the DBC. In Australia, we have granted patents for both BioXp and DBC; and in Japan we have a granted patent for BioXp and a granted patent for the DBC. In Europe we have a granted patent for the BioXp, validated in seven European Patent Convention (EPC) member countries. In Europe we also have a pending application to the DBC. In Canada, we have an allowed application to the BioXp and a pending application to the DBC. In Singapore we have granted patents to the BioXp and DBC. Other patent applications are pending in China and India. In Israel, we have an allowed patent to the BioXp and a pending application to the DBC. The nominal terms of the foregoing patents (including any patents granted on the pending applications) will expire in 2033. In addition, the portfolio contains patents to a key instrument component, a lid engineered to enclose a sample retention area within the very small confines of a laboratory instrument, issued in the U.S., Australia, and China, with corresponding applications pending in Europe and Canada. The nominal terms of the foregoing patents (including any patent granted on the pending application) will expire in 2035. This section of the portfolio also features:

- two U.S. patents relating to a bio-security component to counter misuse of the BioXp and DBC instruments; the nominal term of these patents will expire in 2035; and
- one pending US application and one international (PCT) patent application relating to the BioXp 9600 next generation end-to-end automated workstation.

DNA Synthesis and Assembly

This section of the portfolio features the Gibson Assembly patents, and contains patents in the U.S., Europe (validated in seven EPC member countries), Japan, China, India, Israel, Singapore, Australia, and Canada. The nominal terms of the foregoing OUS patents (including any patents granted on the pending applications) will expire in 2029. In addition, this section includes three filed U.S. applications and two filed PCT applications, each relating to advanced methods of enzymatic DNA synthesis from a pre-manufactured library of components. This section of the portfolio also includes foreign applications in Australia, Canada, China, Europe, India, Japan, and Singapore. Additionally, as of March 1, 2024, this section of the portfolio features:

- pending patent applications in the US (three), Australia (two), Canada (two), China (two), Europe (two), India (two), Japan (two), and Singapore (two) relating to our enzymatic DNA synthesis technology, known as SOLA (short oligonucleotide ligation assembly);
- patents for our advanced error correction technology in the U.S., Europe (validated in seven EPC member countries), Japan, Australia, Singapore, Canada, Israel, and China, expiring in 2033; corresponding or additional applications are pending in Japan, India Europe, and Singapore. The portfolio also contains patents to an earlier error correction technology issued in the U.S., Europe (validated in six EPC member countries), Japan, Canada, and Australia, expiring in 2026;
- an issued U.S. patent to a “PCR variant” method for assembling DNA molecules. The nominal term of any patent granted on this application would expire in 2037;
- patents covering our earlier (pre-Gibson Assembly) DNA assembly methods issued in the U.S. (six patents), Canada (two patents), Malaysia (two patents), and Europe (two patents, each validated in six EPC member countries), expiring in 2026;
- patents relating to a method of sequencing and retrieving individualized or monoclonized nucleic acids from a solid support, issued in the U.S. (six patents) and Europe (three patents, each validated in eight EPC member countries), expiring in 2027;
- issued patents to a PEG-mediated DNA assembly method in Europe (validated in seven EPC member countries), Australia, Canada, Japan, India, Israel, and Singapore, expiring in 2033, with a corresponding application pending in China;
- patents relating to a method of building large DNA molecules, issued in the U.S., Europe (validated in six EPC member countries), Japan, India, China, Australia, Singapore, and Malaysia, expiring in 2028; and
- issued patents to our Rolling Circle Amplification method in the U.S., Europe (validated in six EPC member countries), China, India, Australia, Israel, Brazil, and Hong Kong, expiring in 2026.

Genome engineering

This portfolio family contains two U.S. patents covering a vector useful in Vibrio organisms and an engineered Vibrio organism, expiring in 2036 and 2037, respectively. This family also contains one issued patent for a low endotoxin *Vibrio natriegens* host cell in the U.S. and corresponding applications in Europe and Canada, which if granted as patents would expire in 2038. Additionally, this portfolio contains an issued U.S. patent relating to a Vibrio organism that remains culturable after storage at low temperatures, which expires in 2039. Additionally, this portfolio contains a pending European application, which if granted would expire in 2037. Additionally, as of March 1, 2024, this section of the portfolio features patents relating to encoding identifying watermark sequences into genomes issued in the U.S., Europe (validated in six EPC member countries), Canada, Australia and South Africa, expiring in 2030.

We protect other valuable aspects of our business as confidential know-how, and, if eligible, as trade secrets. For example, we protect certain aspects of our manufacturing processes as trade secrets. Although trade secret protection does not expire as long as the protected information is kept secret from the public, it can be challenging to maintain such efforts. We implement measures designed to protect our trade secrets and other confidential proprietary information, including by physically restricting access to our premises and physically or electronically securing our confidential information, as well as by requiring our employees, consultants, scientific advisors, contractors and commercial partners to execute non-disclosure agreements. However, third parties may independently develop the subject matter of trade secrets that we hold, in which case we have no remedy if such parties should use such subject matter in furtherance of their own commercial interests. Further, while the law may provide remedies against third-party misappropriation or other unlawful access to our trade secrets and other proprietary information, such remedies may be difficult to obtain in practice and may not make our business whole even if successfully obtained. As a result, we may be unable to obtain meaningful benefits from laws intended to protect trade secrets or similar intellectual property rights.

In addition, third parties may initiate litigation against us alleging infringement, misappropriation or other violation of their proprietary rights or seeking a declaration of their noninfringement of our intellectual property rights. An adverse result in any such proceeding could include enjoining of the commercialization of our products, result in significant damages and have a material adverse effect on our business. Even if we are successful in any such litigation, we may be required to incur significant costs and dedicate significant personnel time in defending such litigation.

Government Regulation

FDA Medical Device Regulation

The development, testing, manufacturing, marketing, post-market surveillance, distribution, promotion, advertising and labeling of certain of medical devices are subject to regulation in the United States by the FDA under the Federal Food, Drug, and Cosmetic Act (FDC Act) and comparable state and international agencies. FDA defines a medical device as an instrument, apparatus, implement, machine, contrivance, implant, in vitro reagent or other similar or related article, including any component part or accessory, which is (i) intended for use in the diagnosis of disease or other conditions, or in the cure, mitigation, treatment, or prevention of disease, in man or other animals, or (ii) intended to affect the structure or any function of the body of man or other animals and which does not achieve any of its primary intended purposes through chemical action within or on the body of man or other animals and which is not dependent upon being metabolized for the achievement of any of its primary intended purposes. Medical devices to be commercially distributed in the United States must receive from the FDA either clearance of a premarket notification, known as 510(k), or premarket approval pursuant to the FDC Act prior to marketing, unless subject to an exemption.

The FDA classifies medical devices into one of three classes. Devices deemed to pose lower risk to the patient are placed in either class I or II, which, unless an exemption applies, requires the manufacturer to submit a pre-market notification requesting FDA clearance for commercial distribution pursuant to Section 510(k) of the FDC Act. This process, known as 510(k) clearance, requires that the manufacturer demonstrate that the device is substantially equivalent to a previously cleared and legally marketed 510(k) device or a "pre-amendment" class III device for which pre-market approval applications (PMAs) have not been required by the FDA. This FDA review process typically takes from four to 12 months, although it can take longer. Most class I devices are exempted from this 510(k) premarket submission requirement. If no legally marketed predicate device can be identified for a new device to enable the use of the 510(k) pathway, the new device is automatically classified under the FDC Act as class III, which generally requires PMA approval. However, FDA can reclassify or use *de novo* classification for a device that meets the FDC Act standards for a class II device, permitting the device to be marketed without PMA approval. To grant such a reclassification, FDA must determine that the FDC Act's general controls alone, or general controls and special controls together, are sufficient to provide a reasonable assurance of the device's safety and effectiveness. The *de novo* classification route is generally less burdensome than the PMA approval process.

Devices deemed by the FDA to pose the greatest risk, such as life-sustaining, life-supporting, or implantable devices, or those deemed not substantially equivalent to a legally marketed predicate device, are placed in class III. Class III devices typically require PMA approval. To obtain PMA approval, an applicant must demonstrate the reasonable safety and effectiveness of the device based,

in part, on data obtained in clinical studies. All clinical studies of investigational medical devices to determine safety and effectiveness must be conducted in accordance with FDA's investigational device exemption (IDE) regulations, including the requirement for the study sponsor to submit an IDE application to FDA, unless exempt, which must become effective prior to commencing human clinical studies. PMA reviews generally last between one and two years, although they can take longer.

Additionally, modifications that could significantly affect the safety and effectiveness of any FDA cleared or approved products, such as changes to the intended use or technological characteristics of the products, will require new 510(k) clearances or PMAs for those distributed in the U.S., or similar foreign marketing authorizations for those distributed outside of the U.S., or require the manufacturer to recall or cease marketing the modified devices until these clearances or approvals are obtained. In particular, even after approval of a PMA, a new PMA or PMA supplement may be required in the event of a modification to the device, its labeling or its manufacturing process. Supplements to a PMA may require the submission of the same type of information required for an original PMA, except that the supplement is generally limited to that information needed to support the proposed change from the product covered by the original PMA.

If we decide to expand our products in the future to include clinical or diagnostic products that are regulated by FDA as medical devices, we will be required to delay marketing and commercialization while we obtain premarket clearance or approval from the FDA. There would be no assurance that we could ever obtain such clearance or approval. Obtaining the requisite regulatory approvals, including the FDA quality system inspections that are required for PMA approval, can be expensive and time consuming. The regulatory approval process for such products may be significantly delayed, may be significantly more expensive than anticipated, and may conclude without such products being approved by the FDA. Without timely regulatory clearance or approval, we will not be able to launch or successfully commercialize any diagnostic or clinical medical devices that we may develop in the future.

If regulated as a medical device, after a medical device is placed on the market, numerous regulatory requirements apply, including but not limited to the quality manufacturing requirements set forth in the QSRs, labeling regulations, the FDA's general prohibition against promoting products for unapproved or "off label" uses, registration and listing, the Medical Device Reporting regulation, and the Reports of Corrections and Removals regulation. The FDA can enforce pre- and post-market requirements by unannounced inspection, market surveillance and other means. If the FDA finds a violation, it can institute a wide variety of enforcement actions, ranging from an untitled regulatory letter or a warning letter, to more severe sanctions such as fines, injunctions and civil penalties; recall or seizure of products; operating restrictions, partial suspension or total shutdown of production; refusing requests for 510(k) clearance or PMA approval of new products; withdrawing 510(k) clearance or PMA approvals already granted; and criminal prosecution.

Products Labeled and Marketed for Research Use Only

We label and sell our products for research use only (RUO) and expect to sell them to academic institutions, life sciences and research laboratories that conduct research, and pharmaceutical and biotechnology companies for non-diagnostic and non-clinical purposes. Our RUO products are not intended or promoted for use in clinical practice in the diagnosis of disease or other conditions, and they are labeled for research use only. Accordingly, we believe our products, as we currently intend to market them, are not subject to regulation by FDA. Although FDA regulations require that RUO products be labeled with "For Research Use Only. Not for use in diagnostic procedures," the regulations do not subject such products to the FDA's jurisdiction or the broader pre- and post-market controls for medical devices.

In November 2013, the FDA issued a final guidance on products labeled RUO, which, among other things, reaffirmed that a company may not make any clinical or diagnostic claims about an RUO product, stating that merely including a labeling statement that the product is for research purposes only will not necessarily render the device exempt from the FDA's clearance, approval, or other regulatory requirements if the totality of circumstances surrounding the distribution of the product indicates that the manufacturer knows its product is being used by customers for diagnostic uses or the manufacturer intends such a use. These circumstances may include, among other things, written or verbal marketing claims regarding a product's performance in clinical or diagnostic applications and a manufacturer's provision of technical support for such activities. If FDA were to determine, based on the totality of circumstances, that our products labeled and marketed for RUO are intended for diagnostic purposes, they would be considered medical devices that will require clearance or approval prior to commercialization. Further, sales of devices for diagnostic or clinical purposes may subject us to additional healthcare regulation. We continue to monitor the changing legal and regulatory landscape to ensure our compliance with any applicable rules, laws and regulations.

As discussed above, although our products are currently labeled and sold for research purposes only, the regulatory requirements related to marketing, selling, and supporting such products could be uncertain and depend on the totality of circumstances. This uncertainty exists even if such use by our customers occurs without our consent. If the FDA or other regulatory authorities assert that any of our RUO products are subject to regulatory clearance or approval, our business, financial condition, or results of operations could be adversely affected.

In the future, certain of our products or related applications could become subject to regulation as medical devices by the FDA. For example, if we wish to label and expand product lines to address the diagnosis of disease or for use for a clinical purpose, regulation by governmental authorities in the United States and other countries will become an increasingly significant factor in development, testing, production, labeling, promotion, and marketing. Products that we may develop in the diagnostic, clinical, and healthcare markets, depending on their intended use, may be regulated as medical devices or in vitro diagnostic products (IVDs) by the FDA and comparable agencies in other countries. In the United States, distribution or marketing of medical devices will require us to comply with pre-market and post-market controls imposed by the FDA, unless an exemption applies, and we would be required to obtain either prior 510(k) clearance or prior premarket approval from the FDA before commercializing such medical device.

Laboratory Developed Tests (LDTs)

In some cases, our customers may use our RUO products in their own LDTs or in other FDA-regulated products for clinical diagnostic use, which can also increase our liability. LDTs are developed, validated and used within a single laboratory. In the past, the FDA generally exercised enforcement discretion for LDTs and did not require clearance or approval prior to marketing. On October 3, 2014, FDA issued two draft guidances that proposed to actively regulate LDTs using a risk-based approach, which would have required 510(k)s or PMAs for certain "moderate" or "high" risk devices. Legislative and administrative proposals proposing to amend the FDA's oversight of LDTs have been introduced in recent years and we expect that new legislative and administrative proposals will continue to be introduced from time to time. For example on September 29, 2023, the FDA announced its proposal to amend its regulations to make explicit that all IVDs are devices under the Federal Food, Drug, and Cosmetic Act including when the manufacturer of the IVD is a laboratory. In conjunction with the proposed amendment, the FDA has proposed a policy under which it intends to phase out its general enforcement discretion approach for LDTs so that IVDs manufactured by a laboratory would generally fall under the same enforcement approach as other IVDs. It is also possible that legislation could be enacted into law or regulations or guidance could be issued by the FDA which may result in new or increased regulatory requirements. We will continue to monitor and assess the impact of changing regulatory landscape on our business.

International Medical Device Regulation

To the extent we decide to seek regulatory marketing authorization for certain of our products in countries outside of the United States, we or our partners, or collaborators, will need to obtain regulatory marketing authorization for such products for the intended use in the jurisdiction where such products will be marketed. Regulatory clearance or approval in one jurisdiction does not mean that we will be successful in obtaining regulatory marketing authorization in other jurisdictions where we conduct business.

Sales of such medical products outside the United States will likely be subject to foreign regulatory requirements, which can vary greatly from country to country, as well as FDA regulation on export of medical devices. The European Commission has adopted numerous regulations, directives and standards that address regulation of the design, manufacture, labeling, clinical studies and post-market vigilance for medical devices. Medical devices that comply with the requirements of a relevant directive will be entitled to bear the CE conformity marking, indicating that the device conforms to the essential requirements of the applicable directives and, accordingly, can be marketed throughout the European Union and European Economic Area member states. The European Medical Device Regulation (MDR), which replaces the Medical Device Directive (MDD), come into application on May 26, 2021. Additionally, the In Vitro Diagnostic Regulation (IVDR 2017/746), which addresses several weaknesses of the In Vitro Diagnostic Directive (IVDD 98/79/EC), went into application on May 26, 2022. In March 2023, the European Commission extended the transition timelines for MDR and IVDR for manufacturers of certain medical devices. Compliance with these and other regulations outside of the United States will increase our compliance costs and exposure to liability.

Other Government Regulations

In the United States, various federal and state regulators, including governmental agencies like the Consumer Financial Protection Bureau and the Federal Trade Commission, have adopted, or are considering adopting, laws and regulations concerning personal information and data security. Certain state laws may be more stringent or broader in scope, or offer greater individual rights, with respect to personal information than federal, international or other state laws, and such laws may differ from each other, all of which may complicate compliance efforts. For example, the California Consumer Privacy Act, as amended by the California Privacy Rights Act (CCPA), which increases privacy rights for California consumers and imposes obligations on companies that process their personal information, came into effect on January 1, 2020. Among other things, the CCPA requires covered companies to provide new disclosures to California consumers and provide such consumers new data protection and privacy rights, including the ability to opt-out of certain sales of personal information. The CCPA provides for civil penalties for violations, as well as a private right of action for certain data breaches that result in the loss of personal information. This private right of action may increase the likelihood of, and risks associated with, data breach litigation. Other states, including Virginia, Colorado, Utah, Indiana, Iowa, Tennessee, Montana, Texas, and Connecticut have enacted privacy laws similar to the CCPA that impose new obligations or limitations in areas affecting our business and we continue to assess the impact of these state legislation, on our business as additional information and guidance

becomes available. In addition, laws in all 50 U.S. states require businesses to provide notice to consumers whose personal information has been disclosed as a result of a data breach. State laws are changing rapidly and there is discussion in the U.S. Congress of a new comprehensive federal data privacy law to which we would become subject if it is enacted.

Although we take measures to protect sensitive data from unauthorized access, use or disclosure, our information technology and infrastructure may be vulnerable to attacks by hackers or viruses or breached due to employee error, malfeasance or other malicious or inadvertent disruptions. Any such breach or interruption could compromise our networks and the information stored there could be accessed by unauthorized parties, manipulated, publicly disclosed, lost or stolen. Any such access, breach or other loss of information could result in legal claims or proceedings, and liability under federal or state laws that protect the privacy of personal information, such as the Health Insurance Portability and Accountability Act of 1996 and its implementing regulations (HIPAA), regulatory penalties. In certain cases, notice of breaches must be made to affected individuals, the Secretary of the Department of HHS, and for extensive breaches, notice may need to be made to the media or State Attorneys General. Such a notice could harm our reputation and our ability to compete.

In the future, to the extent we develop any clinical or diagnostic medical devices, our operations in the United States and abroad will be subject to various healthcare laws and enforcement by the applicable government agencies. Such laws include, without limitation, federal and state anti-kickback or anti-referral laws (including the federal Anti-Kickback Statute, which prohibits knowingly or willfully offering or giving anything of value to an actual or potential referral source to induce the referral of business paid for in whole or in part by a federal healthcare program); healthcare fraud and abuse laws; false claims laws (including the federal civil False Claims Act, which allows the federal government to recover administrative penalties plus three times its actual damages from any person that knowingly submits or causes the submission of a false claim for payment to the federal government); federal and state privacy and security laws, such as HIPAA, the CCPA; Physician Payments Sunshine Act and related state transparency and manufacturer reporting laws; marketing compliance and advertising laws; and other laws and regulations applicable to medical device manufacturers. In addition, we are subject to additional laws and regulations in countries where we conduct business, including but not limited to the European Union's General Data Protection Regulation, including as implemented in the U.K. (collectively, GDPR). These laws may impact our operations directly, or indirectly through our contractors, agents, or customers, and may impact, among other things, our sales and marketing strategy.

If our operations are found to be in violation of any of the federal, state, and foreign laws described above or any other current or future fraud and abuse or other healthcare laws and regulations that apply to us, we may be subject to significant penalties, including significant criminal, civil, and administrative penalties, damages, fines, imprisonment for individuals, proceedings or litigation, including class action litigation, exclusion from participation in government programs, such as Medicare and Medicaid, and we could be required to curtail or cease our operations. Any of the foregoing consequences could seriously harm our business and our financial results and prospects.

Given the evolving nature of our industry, legislative bodies or regulatory authorities may adopt additional regulation or expand existing regulation to include our products and services. Changes to the current regulatory framework, including the imposition of additional or new regulations, could arise at any time, and we may be unable to obtain or maintain comparable regulatory authorization for our products and services, if required. These regulations and restrictions may materially and adversely affect our business, financial condition, and results of operations.

Facilities

Our principal facilities are located at 10431 and 10421 Wateridge Circle in San Diego, California and function as our worldwide headquarters. The facilities total approximately 49,077 square feet at 10421 Wateridge Circle and approximately 17,146 square feet at 10431 Wateridge Circle and are leased from BioMed Realty beginning in September 2021 and continuing for 123 months after the lease commencement date (the Wateridge Lease). We are entitled to one option to extend the lease term for an additional five years after the expiry of the original 123 month term. The facilities contain infrastructure for reagent manufacturing and for research and development of new products, as well as for supporting supply chain, logistics and limited office space for administrative and commercial functions. The facilities also include wet labs for both reagent manufacturing and research and development on both floors as well as specialized labs for instrument engineering to support the development of new instruments. A designated instrument services lab space supports our current instrument installed base customers. We amended the Wateridge Lease effective as of January 18, 2024 (the Wateridge Lease Amendment). Under the Wateridge Lease Amendment, we were granted a base rent abatement for the period beginning on January 1, 2024 and ending June 30, 2024. Following the abatement period, base rent was adjusted until the end of the Wateridge Lease.

In connection with the EtonBio Inc., (Eton) acquisition in November 2021, we assumed a lease of office and laboratory space located at 10179 Huennekens Street, San Diego, California. We have recently entered into an amendment under which we occupy approximately 3,500 square feet. The lease term as amended expired in June 2023.

In connection with the Eton acquisition in November 2021, we assumed a lease of office and laboratory space located at 10717 Sorrento Valley Road, San Diego, California. The facility is approximately 8,000 square feet and was leased from Sorrento Realty LLC. The lease term expires in November 2024 and has an option to extend the term for an additional three years at the then current fair market value rental rate for comparable office and laboratory space.

In connection with the Eton acquisition in November 2021, we assumed a lease of office and laboratory space located at 400 Park Offices Drive, Durham County, North Carolina. The facility is approximately 3,000 square feet and was leased from Frontier Hub, LLC. We recently entered into an amendment pursuant to which the contractual lease term was extended. The lease term as amended expires in October 2026.

In connection with the Eton acquisition in November 2021, we assumed a lease office and laboratory space located at 56 Roland Street, Boston, Massachusetts. The facility is approximately 4,300 square feet and was leased from Paradigm Direct Roland. The lease term expired in June 2022, and we currently occupy the space on a month-to-month basis.

In connection with the Eton acquisition in November 2021, we assumed a lease of office and laboratory space located at 1075 Morris Avenue, Union, New Jersey. The facility is approximately 1,200 square feet and was leased from Institute for Life Sciences Entrepreneurship. The lease term expired in November 2022, and we currently occupy the space on a month-to-month basis.

Employees and Human Capital

As of December 31, 2023, we had 132 full-time and 10 part-time employees in the United States and 5 full-time employees located internationally. Our team includes: 32 in commercial sales, marketing, and support, 70 in manufacturing and operations, 11 in research and development, 5 in engineering, and 29 in general and administrative functions. None of our employees is represented by a labor union or covered by a collective bargaining agreement. We consider our relationship with our employees to be good.

Corporate Information and History

We were formed in Delaware as a corporation on March 24, 2011 under the name Synthetic Genomics Solutions, Inc., as a wholly owned subsidiary of Synthetic Genomics, Inc. On February 26, 2013, we changed our name to SGI-DNA, Inc., and on March 31, 2020 we changed our name to Codex DNA, Inc. We subsequently changed our name to Telesis Bio Inc. on November 7, 2022. Our principal executive offices are located at 10431 Wateridge Circle, Suite 150, San Diego, CA 92121. Our telephone number at that address is (858) 228-4115. Our website address is www.telesisbio.com. Information contained on our website is not incorporated by reference into this Annual Report and should not be considered part of this Annual Report.

Implications of Being an Emerging Growth Company

We are an "emerging growth company" as defined in the Jumpstart Our Business Startups Act of 2012, as amended, or the JOBS Act. We will remain an emerging growth company until the earliest to occur of: the last day of the fiscal year in which we have more than $1.235 billion in annual revenue; the date we qualify as a "large accelerated filer," with at least $700.0 million of equity securities held by non-affiliates; the issuance, in any three-year period, by us of more than $1.0 billion in non-convertible debt securities; and the last day of the fiscal year ending after the fifth anniversary of our initial public offering.

An emerging growth company may take advantage of reduced reporting requirements that are otherwise applicable to public companies. These provisions include, but are not limited to:

- not being required to comply with the auditor attestation requirements of Section 404 of the Sarbanes-Oxley Act of 2002, as amended;
- reduced disclosure obligations regarding executive compensation in our periodic reports, proxy statements and registration statements; and
- exemptions from the requirements of holding a nonbinding advisory vote on executive compensation and stockholder approval of any golden parachute payments not previously approved.

In addition, the JOBS Act provides that an emerging growth company can take advantage of an extended transition period for complying with new or revised accounting standards, delaying the adoption of these accounting standards until they would apply to

private companies. We have elected to use this extended transition period to enable us to comply with new or revised accounting standards that have different effective dates for public and private companies until the earlier of the date we (i) are no longer an emerging growth company or (ii) affirmatively and irrevocably opt out of the extended transition period provided in the JOBS Act. As a result, our consolidated financial statements may not be comparable to companies that comply with the new or revised accounting standards as of public company effective dates.

To the extent that we continue to qualify as a "smaller reporting company," as such term is defined in Rule 12b-2 under the Securities Exchange Act of 1934, after we cease to qualify as an emerging growth company, we will continue to be permitted to make certain reduced disclosures in our periodic reports and other documents that we file with the SEC.

Available Information

We make our Annual Reports on Form 10-K, Quarterly Reports on Form 10-Q, Current Reports on Form 8-K, and amendments to those reports, available free of charge at our website as soon as reasonably practicable after they have been filed with the SEC. Our website address is http://telesisbio.com. Information on our website is not part of this report. The SEC maintains a website that contains the materials we file with the SEC at www.sec.gov.

ITEM 1A. RISK FACTORS

Investing in our common stock involves a high degree of risk. You should carefully consider the risks described below, as well as the other information in this Annual Report, including our consolidated financial statements and the related notes and the section titled "Management's Discussion and Analysis of Financial Condition and Results of Operations" in this Annual Report, before deciding whether to invest in our common stock. The occurrence of any of the events or developments described below could harm our business, financial condition, results of operations and prospects. In such an event, the market price of our common stock could decline, and you may lose all or part of your investment. Additional risks and uncertainties not presently known to us or that we currently deem immaterial also may impair our business operations and the market price of our common stock.

SUMMARY OF RISKS

- *Our business is subject to numerous risks and uncertainties that you should consider before investing in our securities. These risks are described more fully below in Item 1.A. These risks include, but are not limited to, the following:*
- We are an early-stage multi-omic and synthetic biology technology company with a history of net losses, which we expect to continue, and we may not be able to generate meaningful revenues or achieve and sustain profitability in the future;
- we have a limited operating history, which may make it difficult to evaluate the prospects for our future viability and predict our future performance;
- our operating results may fluctuate significantly in the future, which makes our future operating results difficult to predict and could cause our operating results to fall below expectations or any guidance we may provide;
- we will need to raise additional capital to fund our continuing operations, which may be unavailable to us on acceptable terms or at all or may cause dilution or place significant restrictions on our ability to operate as a going concern. Our 2022 Loan Agreements may limit our flexibility in financing and operating our business and may adversely affect our business, financial condition and results of operations;
- our management has identified a material weakness in our internal controls;
- sales of shares of our common stock underlying the Redeemable Convertible Preferred Stock and Warrants issued in our recent private placement may cause the market price of our shares to decline;
- we have defaulted under our 2022 Loan Agreements with MidCap and there is continued risk of additional defaults under the 2022 Loan Agreements. The remaining balance of the 2022 Loan Agreements continues to be governed by restrictive covenants that limit our operations and allows MidCap to call our loans if there are additional events of default. Our inability to fulfill these debt obligations could adversely affect working capital needs and financial condition. Further, our 2022 Loan Agreements may limit our flexibility in financing and operating our business, which may adversely affect our business, financial condition and results of operation;
- the holders of Redeemable Convertible Preferred Stock have rights, preferences and privileges that are not held by, and are preferential to, the rights of our common stockholders;
- our directors, officers and principal stockholders have significant voting power and may take actions that may not be in the best interests of our other stockholders;
- our independent registered public accounting firm's report contains an explanatory paragraph that expresses substantial doubt about our ability to continue as a "going concern";
- adverse developments affecting the financial services industry, including events or concerns involving liquidity, defaults or non-performance by financial institutions, could adversely affect our business, financial condition or results of operations;
- we may not be able to achieve or maintain satisfactory pricing and margins for our products;
- if we fail to timely introduce compelling new products, our revenues and our prospects could be harmed;
- the size of the markets for our products may be smaller than estimated, and new market opportunities may not develop as quickly as we expect, or at all, thus limiting our ability to successfully meet our anticipated revenue projections;
- we have limited experience in sales and marketing of our products. If we are unable to expand our sales, marketing distribution and customer service and support capabilities, we may not be successful in commercialiing our current and future products;

- we began manufacturing our BioXp products and certain materials used in our BioXp products in-house in 2023. We have limited experience manufacturing our products and if we directly or indirectly encounter problems manufacturing our products or materials, our business and financial results could suffer;
- we currently rely on single source suppliers for certain components of our instruments and raw materials. If these suppliers should fail or not perform satisfactorily, our ability to commercialize and supply our products would be adversely affected; and
- if we are unable to obtain and maintain sufficient intellectual property protection for our products and technology, or if the scope of the intellectual property protection obtained is not sufficiently broad, our competitors could develop and commercialize products similar or identical to ours, and our ability to successfully commercialize our products and build a strong brand identity may be impaired.

Risks Related to Our Business

We are an early-stage multi-omic and synthetic biology technology company with a history of net losses, which we expect to continue, and we may not be able to generate meaningful revenues or achieve and sustain profitability in the future.

We are an early-stage multi-omic and synthetic biology technology company, and we have incurred significant losses since separating from Synthetic Genomics, Inc. (SGI) and beginning to operate as a stand-alone entity in March 2019, and expect to continue incurring losses in the future as we manufacture and commercialize our products and materials, including our BioXp systems, continue to enhance and develop our products, and implement our business plans and strategies. We incurred a net loss of $47.7 million for the year ended December 31, 2023. As of December 31, 2023, we had an accumulated deficit of $161.5 million. These losses and accumulated deficit were primarily due to the substantial investments we have made to develop, manufacture, commercialize and market our technology and products. Over the next several years, we expect to continue to devote a significant portion of our resources towards the continued development, manufacture and commercialization of our synthetic biology products. These efforts may prove more costly than we currently anticipate. Additionally, we may encounter unexpected development delays, unforseen expenses, operating delays, declines in revenue or other unknown factors that may result in losses in future periods. Accordingly, we cannot assure you that we will achieve profitability in the future or that, if we do become profitable, we will remain profitable.

We have a limited operating history, which may make it difficult to evaluate the prospects for our future viability and predict our future performance.

Our prospects must be considered in light of the uncertainties, risks, expenses, and difficulties frequently encountered by companies in their early stages of operations. For example, our management team has had a limited time working together and many of our key employees are new to our company. Predictions about our future success or viability are highly uncertain and may not be as accurate as they could be if we had a longer operating history or a longer history of successfully developing and commercializing products.

In addition, as a business with a limited operating history, we may encounter unforeseen expenses, difficulties, complications, delays and other known and unknown obstacles. We have encountered in the past, and will encounter in the future, risks and uncertainties frequently experienced by growing companies with limited operating histories in emerging and rapidly changing industries. If our assumptions regarding these risks and uncertainties, which we use to plan and operate our business, are incorrect or change, or if we do not address these risks successfully, our results of operations could differ materially from our expectations, and our business, financial condition and results of operations could be adversely affected.

Our operating results may fluctuate significantly in the future, which makes our future operating results difficult to predict and could cause our operating results to fall below expectations or any guidance we may provide.

Our quarterly and annual operating results have and may continue to fluctuate significantly, which makes it difficult for us to predict our future operating results. These fluctuations have occurred and may occur due to a variety of factors, many of which are outside of our control, including, but not limited to:

- the level of demand for our commercialized products, which may vary significantly from period to period;
- our ability to drive adoption of our products in our target markets and our ability to expand into any future target markets, including internationally;
- the prices at which we will be able to sell our products;

- the volume and mix of our sales between our BioXp systems, BioXp kits, benchtop reagents and other products, or changes in the manufacturing or sales costs related to our products;
- the length of time of the sales cycle for purchases of, or royalties on, our products, including lead time needed to procure critical raw materials from suppliers and finished goods from our third-party contract suppliers and manufacturers;
- the extent to which we succeed in developing, commercializing and supporting new products;
- our ability to obtain necessary export licenses for our products in certain countries and territories;
- potential shortages, or increases in costs, of our product components or raw materials for existing and new products, or other disruptions to our supply chain;
- the timing and cost of, and level of investment in, research and development and commercialization activities relating to our products, which may change from time to time;
- our ability to successfully manage relationships with customers, third-party distributors and suppliers of our products;
- the timing and amount of expenditures that we may incur to develop, commercialize or acquire additional products and technologies;
- changes in governmental funding sources;
- cyclical changes to the research and development budgets within the pharmaceutical, biotechnology and industrial segments of synthetic biology;
- seasonal spending patterns of our customers;
- the expenses needed to attract and retain skilled personnel;
- future accounting pronouncements or changes in our accounting policies;
- the outcome of any litigation or governmental investigations involving us, our industry or both;
- higher than anticipated service, replacement and warranty costs;
- the costs associated with being a public company;
- changes in the regulatory environment;
- the impact of macro-economic factors that affect investment in synthetic biology and research industries, our business operations, and resources and operations of our customers, suppliers, and distributors; and
- general industry, economic and market conditions and other factors, including factors unrelated to our operating performance or the operating performance of our competitors.

The cumulative effects of the factors discussed above could result in large fluctuations and unpredictability in our quarterly and annual operating results. As a result, comparing our operating results on a period-to-period basis may not be meaningful. Investors should not rely on our past results as an indication of our future performance.

This variability and unpredictability could also result in our failing to meet the expectations of industry or financial analysts or investors for any period of time. If our operating results fall below the expectations of analysts or investors or below any guidance we may provide, or if the guidance we provide is below the expectations of analysts or investors, it could cause the market price of our common stock to decline.

We will need to raise additional capital to fund our continuing operations, which may be unavailable to us on acceptable terms or at all or may cause dilution or place significant restrictions on our ability to operate as a going concern. Our 2022 Loan Agreements may limit our flexibility in financing and operating our business and may adversely affect our business, financial condition and results of operations.

If our available cash resources and anticipated cash flow from operations are insufficient to satisfy our liquidity requirements, including because of lower demand for our products or the realization of other risks described herein, we will be required to raise additional capital prior to such time through issuances of equity or convertible debt securities, or seek debt financing or other form of third-party funding.

On August 9, 2022, we entered into (i) a Credit, Security and Guaranty Agreement (Term Loan) (the 2022 Term Loan Agreement), with MidCap Financial Trust (MidCap), and (ii) a Credit, Security and Guaranty Agreement (the 2022 Revolving Loan Agreement, and together with the 2022 Term Loan Agreement, each as amended, (the 2022 Loan Agreements). As of September 30,

2023, we were not in compliance with certain minimum revenue covenants of the 2022 Term Loan Agreement. As a result of this non-compliance, in November 2023 we repaid $15.0 million under the 2022 Term Loan Agreement and granted MidCap a warrant to purchase 275,000 shares of common stock in exchange for amending our 2022 Term Loan Agreements and waiving any other remedies it may have due to our revenue covenant default. We will need to raise funds to offset the amount repaid or refinance the remaining portion of the 2022 Term Loan in order to continue operating the Company at its current spend level. We also may seek to raise additional capital in the future to expand our business, to pursue strategic investments, to take advantage of financing opportunities or for other reasons, including:

- increasing our sales and marketing and other commercialization efforts to drive market adoption of our products;
- funding development and marketing efforts of our current or any future products;
- expanding our technologies into additional markets;
- acquiring, licensing or investing in technologies and other intellectual property rights;
- acquiring or investing in complementary businesses or assets; and
- financing capital expenditures and general and administrative expenses.

Our present and future funding requirements will depend on many factors, including:

- our rate of progress in increasing penetration of our target markets with current and new products, and the cost of the sales and marketing activities associated with establishing adoption of our products;
- our rate of progress in, and cost of research and development activities associated with, products in research and development; and
- the effect of competing technological and market developments.

Our 2022 Loan Agreements restrict our ability to pursue certain transactions that we may believe to be in our best interest. If we are unable to obtain adequate financing or financing on terms satisfactory to us when needed, our ability to continue to pursue our business objectives and to respond to business opportunities, challenges, or unforeseen circumstances could be significantly limited, and could have a material adverse effect on our business, financial condition, results of operations and prospects.

The various ways we could raise additional capital carry potential risks. If we raise funds by issuing equity securities, dilution to our stockholders would result. If we raise funds by issuing debt securities, those debt securities would have rights, preferences and privileges senior to those of holders of our common stock. The terms of debt securities issued or borrowings pursuant to a credit agreement could impose significant restrictions on our operations. If we raise funds through collaborations or licensing arrangements, we might be required to relinquish significant rights to our technologies or products or grant licenses on terms that are not favorable to us.

If we raise funds through the sale of assets, we may sell intellectual property, product lines or other parts of our business. Divestitures involve risks, including difficulties in the separation of operations, services, products and personnel, the diversion of management's attention from other business concerns, the disruption of our business, the potential loss of key employees and the retention of uncertain environmental or other contingent liabilities related to the divested assets. In addition, divestitures may result in significant asset impairment charges, including those related to goodwill and other intangible assets, and the loss of revenue which could have a material adverse effect on our financial condition and results of operations. In addition, we may not realize the expected value from the divested assets and may need to raise additional capital to replace the revenue generated from any assets that are divested. We can provide no assurance that such capital will be available or available on terms that are acceptable to us. We cannot assure you that we will be successful in managing these or any other significant risks that we encounter in selling assets, and any divestiture we undertake could materially and adversely affect our business, financial condition, results of operations and cash flows, and may also result in a diversion of management attention, operational difficulties and losses.

If we are unable to obtain adequate financing or financing on terms satisfactory to us, we may have to delay, reduce the scope of, or discontinue one or more development or commercial programs, delay potential commercialization or reduce the scope of sales or marketing activities and pursue other cost cutting measures, including the reduction of headcount, scope of operations and planned capital expenditures, which may have a material adverse effect on our business, results of operations, financial condition or ability to fund our scheduled obligations on a timely basis or continue as a going concern. Further, our ability to continue to pursue our business objectives and to respond to business opportunities, challenges, or unforeseen circumstances could be significantly limited and could have a material adverse effect on our business, financial condition, results of operations and prospects.

Our independent registered public accounting firm's report contains an explanatory paragraph that expresses substantial doubt about our ability to continue as a "going concern"

As of December 31, 2023, we had $19.3 million of cash, cash equivalents, restricted cash and short-term investments. This raises substantial doubt about our ability to continue as a going concern within one year after the date that the financial statements were issued. See Part II, Item 8, Financial Statements and Supplementary Data, Note 1 of this Annual Report on Form 10-K for additional information on our assessment of our ability to continue as a going concern. Uncertainty regarding our liquidity may have a material and adverse impact on the price of our common stock, which could negatively impact our ability to raise sufficient funds for our operations and continue as a going concern. In addition, cash forecasts and capital requirements are subject to change as a result of a variety of risks and uncertainties. Developments in and expenses associated with our commercialization activities and other research and development activities may consume capital resources earlier than planned. Due to these and other factors, forecasts for any periods in which we indicate that we expect to have sufficient resources to fund our operations, as well as any other operational or business projection we have disclosed, or may disclose, may not be achieved.

Adverse developments affecting the financial services industry, including events or concerns involving liquidity, defaults or non-performance by financial institutions, could adversely affect our business, financial condition or results of operations.

Actual events involving limited liquidity, defaults, non-performance or other adverse developments that affect financial institutions or the financial services industry generally, or concerns or rumors about any events of these kinds or other similar risks, have in the past and may in the future adversely affect our liquidity. For example, on March 10, 2023, the Federal Deposit Insurance Corporation (FDIC) announced that Silicon Valley Bank had been closed by the California Department of Financial Protection and Innovation. At that time, some of our cash and cash equivalents were held at Silicon Valley Bank and our access to such funds was limited until the United States Department of the Treasury announced in a joint statement with the Federal Reserve and FDIC that depositors of Silicon Valley Bank would have access to all of their money starting March 13, 2023. While we regained access to our funds at Silicon Valley Bank and continue to evaluate our banking relationships, our access to funding sources and other credit arrangements in amounts adequate to finance or capitalize our current and projected future business operations could be significantly impaired by events such as liquidity constraints or failures, disruptions or instability in the financial services industry or financial markets, or concerns or negative expectations about the prospects for companies in the financial services industry. These factors may also adversely affect our ability to access our cash and cash equivalents at affected financial institutions.

In addition, investor concerns regarding the U.S. or international financial systems could result in less favorable commercial financing terms, including higher interest rates or costs and tighter financial and operating covenants, or systemic limitations on access to credit and liquidity sources, thereby making it more difficult for us to acquire financing on terms favorable to us, or at all. Any decline in available funding or access to our cash and liquidity resources could, among other things, adversely impact our ability to meet our operating expenses, financial obligations or fulfill our other obligations, result in breaches of our contractual obligations or result in violations of federal or state wage and hour laws. Any of these impacts, or any other impacts resulting from the factors described above or other related or similar factors not described above, could have material adverse impacts on our liquidity and our business, financial condition or results of operations.

We may not be able to achieve or maintain satisfactory pricing and margins for our products.

Our industry has a history of price competition, and we can give no assurance that we will be able to achieve satisfactory prices for our products or maintain prices at the levels we have historically achieved. If we are forced to lower the price we charge for our products, our gross margins will decrease, which will adversely affect our ability to invest in and grow our business. We believe that we will continue to be subject to significant pricing pressure, which may limit our ability to maintain or increase our prices.

Our cost of goods is dependent upon the pricing we are able to negotiate with our suppliers of raw materials, instruments and components. In particular, we have experienced price increases for certain raw materials, such as oligonucleotides, and expect these raw materials to continue to be in high demand. We have also experienced price increases for certain raw materials directly as a result of supply chain issues associated with the COVID-19 pandemic and we are uncertain how long those constraints could continue to impact our raw material pricing. We do not have long term supply contracts for any of our raw materials. If our costs increase and we are unable to offset such increases with a proportionate increase in our prices, our margins would erode, which would harm our business and results of operations.

If we fail to attract new customers, continue to enhance our existing commercialized products or timely introduce compelling new products, our revenues and our prospects could be harmed.

Our ability to attract new customers and increase revenue from existing customers will depend in large part on our ability to timely introduce compelling new products and pursue new market opportunities that develop as a result of technological and scientific advances. The success of any enhancement to our existing commercialized products or introduction of new products depends on

several factors, including timely completion and delivery, cost-effective development and manufacturing, competitive pricing, adequate quality testing, integration with existing technologies, appropriately timed and staged introduction and overall market acceptance. We have experienced supply chain delays and increases in raw material cost for several of our products during development, including our BioXp 9600 system that we launched in 2022. If we continue to experience these delays and increases in cost, our ability to commercialize our BioXp systems or other new, planned products could be delayed. Moreover, any other new product that we develop may not be introduced in a timely or cost-effective manner, may contain defects, errors, vulnerabilities or bugs, or may not achieve the market acceptance necessary to generate significant revenue.

The typical development cycle of new multi-omic and synthetic biology products can be lengthy and complicated, and may require new scientific discoveries or advancements, considerable resources and complex technology and engineering. Such developments may involve external suppliers and service providers, making the management of development projects complex and subject to risks and uncertainties regarding timing, timely delivery of required components or services and satisfactory technical performance of such components or assembled products. If we do not achieve the required technical specifications or successfully manage new product development processes, or if development work is not performed according to schedule, then the development of such new technologies or products may be adversely impacted.

In addition, there is extensive competition in our industry, which is characterized by rapid and significant technological changes, frequent new product introductions and enhancements and evolving industry demands and standards. Our future success will depend on our ability to maintain a competitive position, including technologically superior and less expensive products compared to those of our competitors. Technological development by others may result in our technologies, as well as products developed using our technologies, becoming obsolete. If we are unable to successfully develop new products, compete with alternative products, or otherwise gain and maintain market acceptance, our business, results of operations and financial condition could be harmed.

We have defaulted under our 2022 Loan Agreements with MidCap and there is continued risk of additional defaults under the 2022 Loan Agreements. The remaining balance of the 2022 Loan Agreements continues to be governed by restrictive covenants that limit our operations and allows MidCap to call our loans if there are additional events of default. Our inability to fulfill these debt obligations could adversely affect working capital needs and financial condition. Further, our 2022 Loan Agreements may limit our flexibility in financing and operating our business, which may adversely affect our business, financial condition and results of operation.

Pursuant to the terms of our 2022 Loan Agreements wite MidCap, we borrowed $20.0 million and was eligible to borrow up to an additional $15.0 million upon achievement of certain events. As of September 30, 2023, we were not in compliance with certain minimum revenue covenants of the 2022 Loan Agreements. As a result of this non-compliance, the Lender required us to repay $15.0 million in November 2023 under the 2022 Term Loan Agreements, and as a result, MidCap required us to repay $15.0 million in November 2023. In addition, as a result of such non-compliance, MidCap notified us that it will not offer to extend the additional $15.0 million of debt financing that we were eligible to borrow under the 2022 Loan Agreement prior to our noncompliance in September 2023. We may not be able to replace the cash we used to repay the outstanding amount to MidCap in November 2023 through financings, or refinance the additional amount outstanding, and our operations may be materially impacted.

The 2022 Loan Agreements with MidCap contain various other restrictive covenants and other restrictions, which could limit our ability to take certain actions and reduce our flexibility to run and manage our business, which could have an adverse effect on our results of operations. These restrictive covenants include the following restrictions, among other things:

- our ability to transfer all or part of our business or property, except for inventory in the ordinary course of business, surplus or obsolete equipment, permitted liens, transfers of cash permitted by the agreement or certain other transfers;
- our ability to change our business or move our offices;
- our ability to liquidate or dissolve or merge or consolidate with another entity, or acquire another entity;
- our ability to incur debt or encumber our assets; and
- our ability to pay dividends or make investments, other than permitted investments.

These restrictions may restrict our current and future operations, particularly our ability to respond to certain changes in our business or industry or take future actions. See the section titled “Management’s Discussion and Analysis of Financial Condition and Results of Operations—Liquidity and Capital Resources” for additional information.

Our ability to meet these restrictive covenants may be impacted by events beyond our control. The 2022 Loan Agreements provide that our breach or failure to satisfy certain covenants constitutes an event of default. Additionally, the obligations under the 2022 Loan Agreements are also secured by liens on substantially all of our assets, subject to customary exceptions. If we are unable to repay amounts due under the 2022 Loan Agreements, MidCap could proceed against such assets. Upon the occurrence of an event of

default, our lenders could elect to declare all amounts outstanding under the 2022 Loan Agreements to be immediately due and payable. If the outstanding debt under the 2022 Loan Agreements was to be accelerated, we may not have sufficient cash on hand to repay it, which would have an immediate adverse effect on our business and operating results. This could potentially cause us to cease operations and result in a complete loss of your investment in our common stock.

We depend on our key personnel and other highly qualified personnel, and if we are unable to recruit, train and retain our personnel, we may not achieve our goals.

Our future success depends upon our ability to recruit, train, retain and motivate key personnel. Our senior management team, including Todd R. Nelson, Ph.D., our Chief Executive Officer; William Kullback, our Chief Financial Officer; Daniel Gibson, Ph.D., our Chief Technology Officer; and Eric Esser, our President and Chief Operating Officer, is critical to our vision, strategic direction, product development and commercialization efforts. We have entered into at-will employment agreements with each of Dr. Nelson, Mr. Kullback, Dr. Gibson, and Mr. Esser, and such agreements may be terminated by either party at any time without cause. The departure of one or more of our executive officers, senior management team members or other key employees could be disruptive to our business unless we are able to hire qualified successors. We do not maintain "key man" life insurance on our senior management team.

Our continued growth depends, in part, on attracting, retaining and motivating qualified personnel, including highly trained sales personnel with the necessary scientific background and ability to understand our systems at a technical level to effectively identify and sell to potential new customers. New hires require significant training and, in most cases, take significant time before they achieve full productivity. Our failure to successfully integrate these key personnel into our business could adversely affect our business. In addition, competition for qualified personnel is intense, particularly in the San Diego area, where our operations are headquartered. We compete for qualified scientific and information technology personnel with other life science and information technology companies as well as academic institutions and research institutions.

We do not maintain fixed-term employment contracts with any of our employees. As a result, our employees could leave our company with little or no prior notice and would be free to work for a competitor. Due to the complex and technical nature of our products and technology and the dynamic market in which we compete, any failure to attract, train, retain and motivate qualified personnel could materially harm our business, results of operations, financial condition and prospects.

If we do not sustain or successfully manage our anticipated growth, our business and prospects will be harmed.

Our anticipated growth will place significant strains on our management, operational and manufacturing systems and processes, sales and marketing team, financial systems and internal controls and other aspects of our business. As of December 31, 2023, we had 132 full-time and 10 part-time employees in the United States and 5 full-time employees located internationally. We expect that we will need to hire additional accounting, finance and other personnel in connection to our efforts to comply with the requirements of being a public company. As a public company, our management and other personnel are required to devote a substantial amount of time towards maintaining compliance with these requirements and effectively manage these growth activities. We may face challenges integrating, developing and motivating our rapidly growing employee base. To effectively manage our growth, we must continue to improve our operational and manufacturing systems and processes, our financial systems and internal controls and other aspects of our business and continue to effectively expand, train and manage our personnel. As described in Item 9A below, we have identified a material weakness in our internal controls related to our limited finance, acounting and IT staffing levels. Our ability to correct this weakness and our ability to successfully manage our expected growth is uncertain. If our organization continues to grow, we will be required to implement more complex organizational management structures, and we may find it increasingly difficult to maintain the benefits of our corporate culture, including our ability to quickly develop and launch new and innovative products. If we do not successfully manage our anticipated growth, our business, results of operations, financial condition and prospects will be harmed.

A significant portion of our revenue in the near term will be generated from the sale of our current products.

While we anticipate that a substantial contributor to our growth will come from new product introductions, we expect that in the near term, we will be substantially dependent on the success of the sales of our BioXp systems and the increased sale of BioXp kits to our current customers. There can be no assurance that our current customers will increase their BioXp kit purchases. There can also be no assurance that we will be able to design other products that will meet the expectations of our customers or that any of our future products will become commercially viable. As technologies change in the future for synthetic biology research tools, we will be expected to upgrade or adapt our products in order to maintain the latest technology.

While concentrating our research and development and commercialization efforts on our multi-omics and synthetic biology solutions, we may forego other opportunities that may provide greater revenue or be more profitable. If our research and product development efforts do not result in additional commercially viable products within the anticipated timelines, or at all, our business

and results of operations will be adversely affected. Any delay or failure by us to develop and release our new products or product enhancements would have a substantial adverse effect on our business and results of operations.

Rapidly changing technology in multi-omics and synthetic biology could make the products we are developing obsolete unless we continue to develop and manufacture new and improved products and pursue new market opportunities.

Our industry is characterized by rapid and significant technological changes, frequent new product introductions and enhancements and evolving industry standards. The preferences and needs of our customers may change over time. Our future success will depend on our ability to continually improve the products we are developing, to develop and introduce new products that address the evolving needs of our customers on a timely and cost-effective basis, and to pursue new market opportunities that develop as a result of technological and scientific advances. These new market opportunities may be outside the scope of our proven expertise or in areas which have unproven market demand, and the utility and value of new products developed by us may not be accepted in the markets served by the new products. Our inability to gain market acceptance of new products could harm our future operating results. Our future success also depends on our ability to manufacture these new and improved products to meet customer demand in a timely and cost-effective manner, including our ability to resolve manufacturing issues that may arise as we commence production of these complex products. Unanticipated difficulties or delays in replacing existing products with new products we introduce or in manufacturing improved or new products in sufficient quantities to meet customer demand could diminish future demand for our products and harm our future operating results.

We have and may continue to engage in acquisitions or strategic partnerships acquire or invest in other companies or technologies, which could divert our management's attention, result in additional dilution to our stockholders, reduce our financial resources, cause us to incur debt, disrupt our operations and harm our operating results.

During 2021, we announced the acquisition of EtonBio, Inc. We have and may in the future engage in acquisitions or strategic partnerships and may seek to acquire or invest in other businesses, applications or technologies that we believe could complement or expand our current or future products, enhance our technical capabilities or otherwise offer growth opportunities. For example, in 2021 acquired Eton Bio, Inc., a San Diego-based biotech company specializing in synthetic biology products and services. Any acquisitions or partnerships may divert the attention of management and cause us to incur various costs and expenses in identifying, investigating and pursuing suitable acquisitions, whether or not they are consummated. We may not be able to identify desirable acquisition targets or be successful in entering into an agreement with any particular target or obtain the expected benefits of any acquisition or investment.

To date, the growth of our operations has been mostly organic, and we have limited experience in acquiring and integrating other businesses or technologies. We may not be able to successfully integrate acquired personnel, operations and technologies, or effectively manage the combined business following an acquisition, including the EtonBio, Inc. acquisition. Acquisitions could also result in dilutive issuances of equity securities, the use of our available cash, or the incurrence of debt, which could harm our operating results. In addition, if an acquired business fails to meet our expectations, our operating results, business and financial condition may suffer.

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

We rely, and will continue to rely, on multiple information technology systems to operate the systems that allow our company to function, including cloud-based and on-premises information technology systems. We rely extensively on information technology systems to facilitate our principal company activities, including to operate the cloud-based platform on which the services offered to our customers rely. In addition, we also use information technology systems for a variety of key business functions, including to keep financial records, facilitate our research and development initiatives, manage our manufacturing operations, maintain quality control, fulfill customer orders, maintain corporate records, communicate with staff and external parties, and operate other critical functions.

Like all companies that rely on information technology systems, our information technology systems and those of our vendors and partners are potentially vulnerable to failures of confidentiality, integrity, and availability. Such failures could include, for example, malicious intrusion, corruption of data, and disruptive events, including but not limited to natural disasters and catastrophes. Such failures, if they occur, could compromise company, vendor or partner systems and employee, company, vendor, or partner data. A wide range of cyber attacks, including cyber intrusions, denial of service, and other malicious internet-based activity, such as social engineering and phishing scams, continue to increase. Cloud-based platform providers of services have been and are expected to continue to be targeted by a variety of threat actors, including sophisticated nation-state and nation-state-supported actors. Such threat actors use attack methods that change frequently, are increasingly complex and sophisticated, including social engineering and phishing scams, and can originate from a wide variety of sources, including insider threats or external actors. In addition to traditional

computer "hackers," malicious code, such as viruses and worms, employee theft or misuse, denial-of-service attacks and sophisticated nation-state and nation-state supported actors now engage in attacks, including advanced persistent threat intrusions. In addition, we have not finalized our information technology and data security policies and procedures and therefore, our information technology systems may be more susceptible to such failures and attacks than if such security policies and procedures were finalized. Despite our efforts to create security barriers to such threats, it is virtually impossible for us to entirely mitigate these risks and there is no guarantee that our efforts are or will be adequate to safeguard against all such threats. Moreover, despite our current and future efforts, it is possible that we may not be able to anticipate, detect, appropriately react and respond to, or implement effective preventative measures against, all cybersecurity incidents. Such cybersecurity incidents can be difficult to detect and any delay in identifying such incidents may lead to increased harm and legal exposure of the type described below.

If our security measures, or those of our vendors and partners, are compromised for any reason, including negligence, error, or malfeasance, our principal company activities could cease to function, or be significantly degraded, until such cybersecurity incidents are remediated. Further, our business could be harmed, our reputation could be damaged, and we could become subject to regulatory inquiries or litigation, all of which could result in significant liability. In addition, if we were to experience a prolonged system disruption in our information technology systems or those of certain of our vendors and partners, it could negatively impact our ability to serve our customers, which could adversely impact our business, financial condition, results of operations and prospects. If operations at our facilities were disrupted and could not be promptly restored, such disruption could cause a material disruption in our business, financial condition, results of operations, and prospects. Moreover, there could be public announcements regarding any cybersecurity incidents and, if securities analysts or investors perceive these announcements to be negative, it could, among other things, have a material adverse effect on our business, reputation, financial condition, results of operations and prospects.

Our information technology systems, and those of our vendors and partners, are potentially vulnerable to cybersecurity incidents such as data security breaches, which could lead to the loss and exposure of information, including personal, sensitive, and confidential data, to unauthorized persons, resulting in a data security breach. Any such data security breaches could, among other things, lead to the loss of trade secrets or other intellectual property, or could lead to the exposure of personal information, including sensitive personal information, of our employees, customers and others, any of which could have a material adverse effect on our business, reputation, financial condition, results of operations and prospects. In addition, any such data security breaches could result in legal claims or proceedings, regulatory inquiries, investigations, or actions, and other types of liability under laws that protect the privacy and security of personal information, including federal, state and foreign data protection, privacy, data security, and consumer protection regulations, violations of which could result in significant penalties and fines. Additionally, the introduction and passage of new privacy laws, including but not limited to the California Privacy Rights Act (CPRA), which went into effect on January 1,2023 and modifies the California Consumer Privacy Act (CCPA), potentially resulting in further uncertainty and may require us to incur additional costs and expenses in an effort to comply. The CPRA restricts use of certain categories of sensitive personal information that we may handle, establish restrictions on the retention of personal information, expand the types of data breaches subject to the private right of action, and establish the California Privacy Protection Agency to implement and enforce the new law and impose administrative fines. Additional compliance investment and potential business process changes will likely be required. Similar laws have been proposed in other states and at the federal level, reflecting a trend toward more stringent data privacy and security legislation in the United States. For example, other states, including Virginia, Colorado, Utah, Indiana, Iowa, Tennessee, Montana, Texas, and Connecticut have enacted privacy laws similar to the CCPA that impose new obligations or limitations in areas affecting our business and we continue to assess the impact of these state legislation, on our business as additional information and guidance becomes available. Aspects of these state privacy statutes remain unclear, resulting in further uncertainty and potentially requiring us to modify our data practices and policies and to incur substantial additional costs and expenses in an effort to comply.

In addition, U.S. and international laws and regulations that have been applied to protect user privacy (including laws regarding unfair and deceptive practices in the U.S. and GDPR in the EU/UK) may be subject to evolving interpretations or applications. This area of law is continuing to evolve and is subject to significant uncertainty, which may require us to incur additional costs and expenses in order to comply. Furthermore, responding to a legal claim or proceeding or a regulatory inquiry, investigation, or action, regardless of its merit, could be costly, divert management's attention and harm our reputation. Compliance with these laws and regulations is difficult, constantly evolving, time consuming, and requires a flexible cybersecurity framework and substantial resources. Compliance efforts will likely be an increasing and substantial cost in the future.

Although we have not experienced any major cybersecurity incidents to date, if we do experience an incident, the cost of protecting against, investigating, mitigating and responding to these cybersecurity incidents and data security breaches, and complying with applicable breach notification obligations to individuals, regulators, vendors, partners, and others can be significant. As threats related to cybersecurity incidents and data security breaches continue to evolve, we may be required to expend significant additional resources to continue to modify or enhance our protective measures or to detect, appropriately react to, and respond to such cybersecurity incidents and data security breaches. The inability to implement, maintain and upgrade adequate safeguards could have a material adverse effect on our business, financial condition, results of operations and prospects. Should such disruptions occur, our current insurance policies may not be adequate to compensate us for the potential costs and other losses arising from such disruptions,

failures, or security breaches and it is possible that an insurer could deny coverage on any future claim. In addition, such insurance may not be available to us in the future on economically reasonable terms or at all. The successful assertion of one or more large claims against us that exceed available insurance coverage, or the occurrence of changes in our insurance policies, including premium increases or the imposition of large deductible or co-insurance requirements, could have a material adverse effect on our business, financial condition, results of operations and prospects.

A customer may unintentionally misuse our products or a bad actor may intentionally use our products with intent to create harm and, in either case, third parties may seek to hold us liable for the resulting harm.

All orders for our products that we receive are processed through a security filter. We verify that the shipping addresses of our customers are valid, screen the customer versus known agent lists and comply in all material respects with the know your customer rules. Despite these precautions it is possible that one of our customers may unintentionally misuse our products or a bad actor may attempt to misuse our products to create harm. If misuse of our products were to occur, the terms and conditions of our invoices may be insufficient to protect us from liability. Any indemnification that our customers are required to provide to us may be insufficient to cover the costs and damages resulting from the misuse of our products. Further, any product liability insurance we may obtain could specifically exclude bad acts of our customers from coverage or coverage limits may be insufficient to protect us from the amount of the liability we could incur. Any unintentional or intentional misuse of our products could result in liability or require us to expend costs to defend ourselves, may not be covered by insurance and may have a material and adverse effect on our business or results of operations.

Risks Related to Supply, Manufacturing and Distribution of Our Products

We began manufacturing our BioXp products and certain materials used in our BioXp products in-house in 2023. We have limited experience manufacturing our products and if we directly or indirectly encounter problems manufacturing our products or materials, our business and financial results could suffer.

We have historically relied on a single contract manufacturer for our BioXp instruments. We began manufacturing all of our BioXp 9600 systems in-house in mid-2023 and all of our BioXp 3250 systems in the second half of 2023. Manufacturing our instruments is a highly exacting and complex process. Problems can arise during manufacturing for a variety of reasons, including equipment malfunction, failure to follow specific protocols and procedures, problems with raw materials or components, cyber-attacks, natural disasters and environmental factors, and if not discovered before the product is released to market, such problems could adversely affect our ability to achieve our sales goals and could result in adverse impacts to our business and financial condition. In addition, if we are unable to properly manufacture our BioXp systems, we may not find an alternative manufacturer on a timely basis, or at all, to supply sufficient quantities or at an acceptable cost or quality, which could delay, prevent or impair commercialization of our instruments.

Additionally, we have historically relied on external vendors to supply the oligonucleotides we use as raw material in our BioXp kit products. We also began manufacturing oligonucleotides in our own manufacturing facility in 2023 and expect to scale our internal manufacturing operation to supply the majority of this raw material internally. We have limited experience manufacturing oligonucleotides and it is a highly complex process that requires specialized equipment and techniques. Problems may arise that could affect both our ability to produce sufficient volume or achieve sufficient quality of oligonucleotides. Some raw material quality issues may be difficult to detect prior to assembly into our products. This transition requires that we technically achieve our manufacturing startup milestones as well as navigate the wind-down of external supply. Should we fail to achieve our goals in manufacturing, or fail to properly manage the wind-down of external supply, our ability to supply kits would be adversely affected.

We currently rely on single source suppliers for certain components of our instruments and raw materials. If these suppliers should fail or not perform satisfactorily, our ability to commercialize and supply our products would be adversely affected.

Certain of the components used in our instruments are sourced from limited or single-source suppliers. If we were to lose such suppliers, there can be no assurance that we will be able to identify or enter into agreements with alternative suppliers on a timely basis on acceptable terms, if at all. An interruption in our ability to sell and deliver instruments to customers could occur if we encounter delays or difficulties in securing these components, or if the quality of the components supplied do not meet our specifications, or if we cannot then obtain an acceptable substitute, or if we experience continued increases in the costs of these components due to inflationary pressures. If any of these events occur, our business, results of operations, financial condition and prospects could be harmed.

We also rely on third parties for certain components of our BioXp kits and benchtop reagents, including the nucleotides we use in our BioXp kits, which are primarily sourced from Integrated DNA Technologies, Inc. (IDT), a division of Danaher Corporation. In the past, supply issues with IDT caused us to rely on an alternative supplier for these components and raw materials. We cannot

guarantee that we will be able to source these materials at similar quantities and on similar terms if our preferred suppliers were to become unable or unwilling to fulfill our requirements.

Our reliance on third party manufacturers subjects us to risks associated with their businesses and operations. This dependence on others may harm our ability to develop and commercialize our products on a timely and competitive basis. Any such failure may result in decreased product sales and lower product revenue, which would harm our business. For example, even if we have agreements with third parties, they may not perform their obligations to us and they may be unable or unwilling to establish or increase production capacity commensurate with our needs. Disputes may also arise between us and our suppliers that result in the delay or termination of commercialization or that result in costly litigation or arbitration that diverts management's attention and resources. Also, third party manufacturers are subject to their own operational and financial risks that are outside of our control, and potentially their control also, that may cause them to suffer liquidity or operational problems and that could interfere with their business operations.

We have limited experience producing and supplying our products. We may be unable to consistently manufacture or source our products to the necessary specifications or in quantities necessary to meet demand on a timely basis and at acceptable performance and cost levels.

Our BioXp systems, BioXp kits and benchtop reagents comprise an integrated solution with many different components that work together. As such, a quality defect in a single component can compromise the performance of the entire system. In order to successfully generate revenue from this product line, we need to supply our customers with products that meet their expectations for quality and functionality in accordance with established specifications on a timely basis. Our instruments are manufactured using complex processes, sophisticated equipment and strict adherence to specifications and quality systems procedures. Given the complexity of this instrumentation, individual units may occasionally require additional installation and service prior to becoming available for customer use. We have experienced quality issues with certain of our mRNA BioXp kits in the past and if we have additional issues with this product or future products, our business could be harmed.

As we continue to scale commercially and develop new products, and as our products incorporate increasingly sophisticated technology, it will become more difficult to ensure our products are produced in the necessary quantities while maintaining quality. There is no assurance that we or our third-party manufacturers will be able to continue to manufacture our products so that our technology consistently achieves the product specifications and produces results with acceptable quality. In addition, our BioXp kits and benchtop reagents have a limited shelf life, after which their performance is not ensured and many of our products must be shipped and stored at controlled temperatures. Shipment of BioXp kits and benchtop reagents that exceed their shelf life or shipment of defective products to customers may result in recalls and warranty replacements, which would increase our costs and may damage our reputation, and depending upon current inventory levels and the availability and lead time for additional inventory, could lead to availability issues. Any future design issues, unforeseen manufacturing problems, such as contamination of our or our manufacturers' facilities, equipment malfunctions, aging components, quality issues with components and materials sourced from third-party suppliers, or failures to strictly follow procedures or meet specifications, may have a material adverse effect on our brand, business, reputation, results of operations and financial condition and could result in us or our third-party manufacturers losing International Organization for Standardization (ISO) or quality management certifications. If our third-party manufacturers fail to maintain ISO quality management certifications, our customers might choose not to purchase products from us.

In addition, as we scale our commercial operations, we will also need to make corresponding improvements to other operational functions, such as our customer support, service and billing systems, compliance programs and internal quality assurance programs. We cannot assure you that any increases in scale, related improvements and quality assurance will be successfully implemented or that appropriate personnel will be available. As we develop additional products, we may need to bring new equipment on-line, implement new systems, technology, controls and procedures and hire personnel with different qualifications.

An inability to manufacture products and components that consistently meet specifications, in necessary quantities, at commercially acceptable costs and without significant delays, may have a material adverse effect on our business, results of operations, financial condition and prospects.

We must continue to secure and maintain sufficient and stable supplies of components and raw materials.

Certain disruptions in the supply of, and changes in the competitive environment for, components and raw materials integral to the manufacturing of our products may adversely affect our profitability. We use a broad range of materials and supplies in our products. A significant disruption in the supply of these materials could decrease production and shipping levels, materially increase our operating costs and materially and adversely affect our revenues and profit margins. For example, we have experienced supply chain delays for several of our products during development, including our BioXp 9600 system. Shortages of materials or interruptions in transportation systems, labor strikes, work stoppages, war, acts of terrorism or other interruptions to or difficulties in

the employment of labor or transportation in the markets in which we purchase materials, components and supplies for the production of our products, in each case, may adversely affect our ability to maintain production of our products and achieve profitability. Unforeseen discontinuation or unavailability of certain components, such as enzymes or nucleotides, each of which we currently primarily source from a single supplier, could cause backorders as we modify our product specifications to accommodate replacement components. If we were to experience a significant or prolonged shortage of critical components from any of our suppliers and could not procure the components from other sources, we would be unable to manufacture our products and ship them to our customers in a timely fashion, or at all, which would adversely affect our sales, margins and customer relations.

Our products could have defects or errors, giving rise to claims against us, adversely affecting market adoption and negatively impacting our business, financial condition, and results of operations.

Our products utilize novel and complex technology related to writing synthetic DNA and mRNA and may develop or contain undetected defects or errors. We cannot assure you that material performance problems, defects, or errors will not arise, and as we commercialize our products, these risks may increase. We provide warranties at the point of sale that our products will meet performance expectations and will be free from defects. We also provide extended warranties at an additional cost to the customer. The costs incurred in correcting any defects or errors may be substantial and could adversely affect our operating margins.

In manufacturing our products, we depend upon third parties for the supply of various components, many of which require a significant degree of technical expertise to produce. If we fail to make our products to specification or produce defective products, or if our suppliers fail to make our components to specification or provide defective components to us, and our quality control tests and procedures fail to detect such errors or defects, or if we or our suppliers use defective materials or workmanship in the manufacturing process, the reliability and performance of our products will be compromised.

If our products contain defects, we may experience:

- a failure to achieve market acceptance for our products;
- loss of customer orders and delay in order fulfillment;
- damage to our reputation;
- increased warranty and customer service and support costs due to product repair or replacement;
- product recalls or replacements;
- inability to attract new customers;
- diversion of resources from our manufacturing and research and development departments into our service department; and
- legal claims against us, including product liability claims, which could be costly and time consuming to defend and result in substantial damages.

If we become subject to product liability claims, we may be required to pay damages out of our cash reserves.

Our business exposes us to potential product liability claims that are inherent in the production, marketing and sale of biotechnological and genetic products. We do not currently have product liability insurance and any product liability claim, or recall of one of our products, would have to be paid out of our cash reserves.

Shipping is a critical part of our business. Any changes in our shipping arrangements or damages or losses sustained during shipping could adversely affect our business, financial condition, results of operations and prospects.

We currently rely on commercial carriers for our shipping. If we are not able to negotiate acceptable pricing and other terms with these carriers, or if they experience performance problems or other difficulties, it could negatively impact our operating results and our customers' experience. If a product is damaged in transit, it may result in a substantial delay in the fulfillment of the customer's order, and depending on the type and extent of the damage and whether the incident is covered by insurance, it may result in a substantial financial loss to us. If our products are not delivered in a timely fashion or are damaged or lost during the delivery process, our customers could become dissatisfied and cease using our products or services, which would adversely affect our business, financial condition, results of operations and prospects.

Our business depends on our ability to quickly and reliably deliver our products and in particular, our BioXp kits and benchtop reagents, to our customers. Certain of these products are perishable and must be kept below certain temperatures and, therefore, we ship these products on dry ice and only ship such products on certain days of the week to reach customers without spoilage.

Disruptions in the delivery of these products, whether due to labor disruptions, bad weather, natural disasters, terrorist acts or threats or for other reasons could result in our customers receiving products that are not fit for use, and if used, could result in inaccurate results or ruined experiments. While we work with customers to replace any products that are impacted by delivery disruptions, our reputation and our business may be adversely impacted even if we replace products free of charge. In addition, if we are unable to continue to obtain expedited delivery services on commercially reasonable terms, our operating results may be adversely affected.

In addition, should our commercial carriers encounter difficulties in delivering our products to customers, particularly at the end of any financial quarter, it could adversely impact our ability to recognize revenue for those products in that period and accordingly adversely affect our financial results for that period.

Risks Related to Our Sales, Marketing and Customer Support

We have limited experience in sales and marketing of our products. If we are unable to expand our sales, marketing, distribution and customer service and support capabilities, we may not be successful in commercializing our current and future products.

We have limited experience in sales and marketing our products. Our ability to achieve profitability depends on our being able to attract customers for our products. To meet our sales objectives, we may need to expand our sales, marketing, distribution and customer service and support capabilities with personnel with the appropriate technical expertise. In undertaking expansion efforts, we will face a number of risks relating to:

- our ability to attract, retain and manage the sales, marketing and customer service and support personnel necessary to commercialize and gain market acceptance for our technology;
- the time and cost of maintaining specialized sales, marketing and customer service and support personnel; and
- the relative success of our sales, marketing and customer service and support personnel.

We currently enlist, and may in the future seek to enlist one or more third parties to assist with sales, distribution and customer service and support. There is no guarantee that we will be successful in attracting effective sales and distribution partners or that we will be able to enter into such arrangements on favorable terms. If our sales and marketing efforts, or those of any third-party sales and distribution partners, are not successful, our products, including the BioXp systems, may not gain market acceptance, which could materially impact our business and results of operations.

A substantial proportion of our sales are through distributors, and we do not control their efforts to sell our products. If our relationships with these third-party distributors deteriorate, or if these third-party distributors fail to sell our products or engage in activities that harm our reputation, our financial results may be negatively affected.

Our current sales model includes direct sales in North America and parts of Europe, and relationships with third party distributors in other parts of Europe and various countries in the Middle East, Africa and Asia Pacific regions. We believe that our reliance on distributors improves the economics of our business, as we do not carry the high fixed costs of a direct sales force in many of the countries in which our products are sold. If we are unable to maintain or enter into such distribution arrangements on acceptable terms, or at all, we may not be able to successfully commercialize our products in certain countries.

Furthermore, distributors can choose the level of effort that they apply to selling our products relative to others in their portfolio. The selection, training, and compensation of distributors' sales personnel are within their control rather than our own and may vary significantly in quality from distributor to distributor. They may experience their own financial difficulties, or distribution relationships may be terminated or allowed to expire, which could increase the cost of or impede commercialization of our products in applicable countries. Disputes may also arise between us and our distributors that result in the delay or termination of commercialization or that result in costly litigation or arbitration that diverts management's attention and resources. Distributors may not properly maintain or defend our intellectual property rights or may use our proprietary information in such a way as to invite litigation that could jeopardize or invalidate our proprietary information or expose us to potential litigation. Distributors could move forward with competing products developed either independently or in collaboration with others, including our competitors.

In addition, although our contract terms require our distributors to comply with all applicable laws regarding the sale of our products, including regulatory labeling, protection of personal data, U.S. export regulations and the U.S. Foreign Corrupt Practices Act (FCPA), we may not be able to ensure proper compliance. If our distributors fail to effectively market and sell our products in full compliance with applicable laws and regulations, our results of operations and business may suffer.

The size of the markets for our products may be smaller than estimated, and new market opportunities may not develop as quickly as we expect, or at all, thus limiting our ability to successfully meet our anticipated revenue projections.

The market for synthetic biology technologies and products is evolving, making it difficult to predict with any accuracy the size of the markets for our current and future products, including our BioXp systems, BioXp kits and benchtop reagents. Our estimates of the total addressable market for our current and future products are based on a number of internal and third-party estimates and assumptions. In particular, our estimates are based on our expectations that researchers in the market for certain synthetic biology research tools and technologies will view our products as competitive alternatives to, or better options than, existing tools and technologies. We also expect researchers will recognize the ability of our products to complement, enhance and enable new applications of their current tools and technologies. Underlying each of these expectations are a number of estimates and assumptions that may be incorrect, including the assumptions that government or other sources of funding will continue to be available to synthetic biology researchers at times and in amounts necessary to allow them to purchase our products and that researchers have an unmet need for performing synthetic biology applications. As a result, the sizes of the annual total addressable market for new markets and new products are even more difficult to predict. The synthetic biology market may develop more slowly or differently than we expect. While we believe our assumptions and the data underlying our estimates of the total addressable market for our products are reasonable, these assumptions and estimates may not be correct and the conditions supporting our assumptions or estimates, or those underlying the third-party data we have used, may change over time, thereby reducing the accuracy of our estimates. As a result, our estimates of the total addressable market for our products may be incorrect.

The future growth of the market for our current and future products depends on many factors beyond our control. For example, in 2020, 11% of our revenue was from products specifically targeting research and development efforts related to COVID-19 vaccines and therapeutic products. As effective COVID-19 vaccines or treatments were developed, approved and rolled out to protect against and treat the COVID-19 virus, demand for these products declined, the size of our market opportunity for such products was impacted and our revenue was affected as a result. In 2023, our revenue from COVID-19 related products was less than 1% of total revenue.

We expect that our products will be subject to the market forces and adoption curves common to other new technologies. The market for synthetic biology technologies and products is in its early stages of development. Sales of new products into new market opportunities may take years to develop and mature and we cannot be certain that these market opportunities will develop as we expect. If the markets for our current and future products are smaller than estimated or do not develop as we expect, our growth may be limited and our business, financial condition and operational results of operations could be adversely affected.

Our success depends on broad scientific and market acceptance of our products, which we may fail to achieve.

Our ability to achieve and maintain scientific and commercial market acceptance of our products will depend on a number of factors. If widespread adoption of our products takes longer than anticipated, we will continue to experience operating losses.

The success of life sciences products is due, in large part, to recognition and acceptance by the scientific community, their adoption of these products in the applicable field of research and the growth, prevalence and costs of competing products. Such recognition and acceptance of our products may not occur in the near term, or at all. New synthetic biology technology, including our own Gibson SOLA and other new technologies, may not be adopted until the consistency and accuracy of such technology has been proven, if ever.

Other factors in achieving commercial market acceptance of our products include:

- our ability to market and increase awareness of the capabilities of our products;
- our customers' willingness to adopt new products and workflows;
- whether early adopters and key opinion leaders (KOLs) publish research involving the use of our products;
- our products' ease-of-use and whether it reliably provides advantages over alternative technologies;
- the rate of adoption of our products and services by academic institutions, laboratories, biopharmaceutical companies and others;
- the prices we charge for our products;
- our ability to develop new products and workflows;
- whether competitors commercialize products that perform similar functions as our products; and
- the impact of our investments in product innovation and commercial growth.

We cannot assure you that we will be successful in addressing each of these criteria or other criteria that might affect the market acceptance of any products we commercialize. If we are unsuccessful in achieving and maintaining scientific and market acceptance of our products, our business, financial condition and results of operations would be adversely affected.

The synthetic biology technology market is highly competitive. If we fail to compete effectively, our business and results of operation will suffer.

We face significant competition in the synthetic biology technology market. We currently compete with synthetic biology technology companies and the companies that are supplying components, products and services that serve customers engaged in synthetic biology research. These companies include, among others, Thermo Fisher Scientific Inc.; Danaher Corporation; Azenta; GenScript Biotech Corporation; SAS; Integrated DNA Technologies, Inc.; Molecular Assemblies, Inc.; Nuclera Nucleics Ltd; Nutcracker Therapeutics, Inc.; Twist Bioscience Corporation; Aldevron, LLC; TriLink BioTechnologies, Inc.; Evonetix Ltd.; Eurofins Scientific; Synthego Corporation; Illumina, Inc.; and Roche AG.

Some of our current competitors are large, publicly-traded companies, or are divisions of large publicly-traded companies, and may enjoy a number of competitive advantages over us, including:

- greater name and brand recognition;
- greater financial and human resources;
- broader product lines;
- larger sales forces and more established distributor networks;
- substantial intellectual property portfolios;
- larger and more established customer bases and relationships; and
- better established, larger scale and lower cost manufacturing capabilities.

We cannot assure investors that our products will compete favorably or that we will be successful in the face of increasing competition from products and technologies introduced by our existing or future competitors or companies entering our markets. In addition, we cannot assure investors that our competitors do not have or will not develop products or technologies that currently or in the future will enable them to produce competitive products with greater capabilities or at lower costs than ours. Any failure to compete effectively could materially and adversely affect our business, financial condition and operating results.

Our revenue, results of operations and cash flows would be adversely affected by the loss of a significant customer.

We have derived, and we may continue to derive, a significant portion of our revenues from a limited number of large customers. We estimate that our twenty largest customers accounted for 54% and 59% of our revenue for the years ended December 31, 2022 and December 31, 2023, respectively. The loss of key customers, or the reduction in the amount of product ordered by them may adversely affect our revenue, results of operations, cash flows and reputation in the marketplace. One customer, Pfizer, Inc., accounted for 33% of our revenue for the year ended December 31, 2023, primarily attributable to a Research and License Agreement. We cannot assure you that Pfizer, Inc. will fully adopt our technology in its clinical processes and as such cannot assure you that we will continue to derive significant revenue from that agreement.

We generally do not have long-term contracts with our customers requiring them to purchase any specified quantities of products from us.

We generally do not have long-term contracts with our customers requiring them to purchase any specified quantities of products from us. Without such contracts, our customers are not obligated to order our products. We cannot accurately predict our customers' decisions to reduce or cease purchasing our products. Additionally, even where we enter into contracts with our customers, there is no guarantee that such agreements will be negotiated on terms that are commercially favorable to us in the long term. If many of our customers were to substantially reduce their purchase volume or cease ordering products from us, this could materially and adversely affect our financial performance.

Our business will depend significantly on research and development spending by the pharmaceutical, biotechnology and industrial agricultural customers, as well as academic institutions and other research institutions. Any reduction in spending could limit demand for our products and adversely affect our business, results of operations, financial condition and prospects.

We expect that substantially all of our sales revenue in the near term will be generated from sales to pharmaceutical, biotechnology and industrial agricultural customers, as well as academic institutions and other research institutions. Much of these customers' funding is dependent on annual research and development budgets and in the case of academic and other research institutions will be, in turn, provided by various state, federal and international government agencies. As a result, the demand for our products will depend upon the research and development budgets of these customers, which are impacted by factors beyond our control, such as:

- research and development budgets within the pharmaceutical, biotechnology, agricultural and other industries;
- government funding of research and development;
- changes to programs that provide funding to research laboratories and institutions, including changes in the amount of funds allocated to different areas of research or changes that have the effect of increasing the length of the funding process;
- macroeconomic conditions and the political climate;
- potential changes in the regulatory environment;
- differences in budgetary cycles, especially government- or grant-funded customers, whose cycles often coincide with government fiscal year ends;
- market-driven pressures to consolidate operations and reduce costs; and
- scientific and market acceptance of relatively new synthetic biology products.

In addition, various state, federal and international agencies that provide grants and other funding may be subject to stringent budgetary constraints that could result in spending reductions, reduced grant making, reduced allocations or budget cutbacks, which could jeopardize the ability of funding organizations or the organizations to whom they provide funding, to purchase our products. For example, congressional appropriations to the National Institutes of Health (NIH), have generally increased year-over-year for the last 19 years, and reached a new high in 2020, but the NIH also experiences occasional year-over-year decreases in appropriations, including as recently as 2013. In addition, funding for life science research has increased more slowly during the past several years compared to previous years and has actually declined in some countries. There is no guarantee that NIH appropriations will not decrease in the future, and a decrease may be more likely under the current administration, whose annual budget proposals have repeatedly decreased NIH appropriations. A decrease in the amount of, or delay in the approval of, appropriations to NIH or other similar United States or international organizations, such as the Medical Research Council in the United Kingdom, could result in fewer grants benefiting synthetic biology research. These reductions or delays could also result in a decrease in the aggregate amount of grants awarded for synthetic biology research or the redirection of existing funding to other projects or priorities, any of which in turn could cause our customers and potential customers to reduce or delay purchases of our products. Our operating results may fluctuate substantially due to any such reductions and delays. Any decrease in our customers' budgets or expenditures, or in the size, scope or frequency of their capital or operating expenditures, could materially and adversely affect our business, results of operations, financial condition and prospects.

Our success depends on our ability to service and support our products directly or in collaboration with our strategic partners.

To the extent that we or our strategic partners fail to maintain a high quality level of service and support for our products, there is a risk that the perceived quality of our products will be diminished in the marketplace. Likewise, we may fail to provide the level, quantity or quality of service expected by the marketplace. This could result in slower adoption rates and lower than anticipated utilization of our products, which could have a material adverse effect on our business, financial condition and results of operations.

Risks Related to Health Pandemics, including the Recent COVID-19 Pandemic and Other Natural Disasters

Unfavorable U.S. or global economic conditions, including inflation, as a result of the COVID-19 pandemic, or otherwise, could adversely affect our ability to raise capital and our business, results of operations and financial condition.

While the potential economic impact brought by the COVID-19 pandemic is difficult to assess, the COVID-19 pandemic resulted in, and may continue to result in, extreme volatility and disruptions in the capital and credit markets in general and has negatively impacted our stock price since becoming a public company in 2021. Should this impact continue, our ability to raise additional capital through equity, equity-linked or debt financings, will be reduced, which could negatively impact our short-term and long-term liquidity and our ability to operate in accordance with our operating plan, or at all. Additionally, our results of operations

could be adversely affected by general conditions in the global economy, including inflation, and financial markets. The capital markets or general economic conditions may be adversely affected by geopolitical risks, hostilities, terrorist attacks or wars, including the current war between Russia and Ukraine and ongoing hostilities in the Middle East. A severe or prolonged economic downturn could result in a variety of risks to our business, including weakened demand for our products and our ability to raise additional capital when needed on favorable terms, if at all. A weak or declining economy could strain our customers' budgets or cause delays in their payments to us. Any of the foregoing could harm our business. We cannot anticipate all of the ways in which the current economic climate and financial market conditions could adversely impact our ability to raise capital, business, results of operations and financial condition.

If our facilities or our third-party manufacturers' facilities become unavailable or inoperable, our research and development program and commercialization of our products could be adversely impacted and manufacturing of our products could be interrupted.

Our San Diego, California, facilities house our corporate, research and development, manufacturing operations and quality assurance teams. Currently, all of our BioXp systems are manufactured in our San Diego facilities and our BioXp kits and benchtop reagents are manufactured at various locations in the United States and internationally, including our San Diego facilities. We do not have a second or back-up facility to use if our San Diego facilities become inoperable.

Our facilities in San Diego and those of our third-party manufacturers are vulnerable to natural disasters, public health crises, and catastrophic events. For example, our San Diego facilities are located near earthquake fault zones and are vulnerable to damage from earthquakes as well as other types of disasters, including fires, floods, power loss, communications failures and similar events. If any disaster, public health crisis or catastrophic event were to occur, our ability to operate our business would be seriously, or potentially completely, impaired. If our facilities or our third-party manufacturer's facilities become unavailable for any reason, we cannot provide assurances that we will be able to secure alternative manufacturing facilities with the necessary capabilities and equipment on acceptable terms, if at all. We may encounter particular difficulties in replacing our San Diego facilities given the specialized equipment housed within it. The inability to manufacture our products, combined with our limited inventory of finished products, may result in the loss of future customers or harm our reputation, and we may be unable to re-establish relationships with those customers in the future.

If our research and development program or commercialization program were disrupted by a disaster or catastrophe, the launch of new products, including our workflow automation and reagent solutions, and the timing of improvements to our products could be significantly delayed and could adversely impact our ability to compete with other available products and solutions. If our or our third-party manufacturer's capabilities are impaired, we may not be able to manufacture and ship our products in a timely manner, which would adversely impact our business. Although we possess insurance for damage to our property and the disruption of our business, this insurance may not be sufficient to cover all our potential losses and may not continue to be available to us on acceptable terms, or at all.

The COVID-19 pandemic and efforts to reduce its spread have adversely impacted our business and operations.

The COVID-19 pandemic had an adverse impact on our operations, particularly as a result of preventive and precautionary measures that we, other businesses and governments took as a result of the pandemic. Governmental mandates related to COVID-19 impacted the availability and cost of materials, which disrupted or delayed our receipt of components and supplies from the third parties we rely on to, among other things, manufacture our BioXp systems, BioXp kits and benchtop reagents or source and timely receive parts and components from third parties. Moreover, the COVID-19 pandemic had a significant impact on our ability to retain employees and forced us to fill positions more frequently than we have had to do so in the past. To the extent that any governmental authority imposes additional regulatory requirements or changes existing laws, regulations and policies that apply to our business and operations, such as additional workplace safety measures for new health related crises, our product development plans may be delayed, and we may incur further costs in bringing our business and operations into compliance with changing or new laws, regulations and policies. On May 11, 2023, President Biden's administration ended the COVID-19 national and public health emergencies. The full impact of the termination of the public health emergencies on FDA and other regulatory policies and operations is unclear.

Risks Related to Doing Business Internationally

Doing business internationally creates operational and financial risks for our business.

We estimate that during the fiscal years ended December 31, 2022 and December 31, 2023, approximately 14% of our revenue was generated from customers located outside of the United States. Conducting and launching operations on an international scale requires close coordination of activities across multiple jurisdictions and time zones and consumes significant management resources.

If we fail to coordinate and manage these activities effectively, our business, financial condition or results of operations could be adversely affected. International sales entail a variety of risks, including longer payment cycles and difficulties in collecting accounts receivable outside of the United States, currency exchange fluctuations, challenges in staffing and managing foreign operations, tariffs and other trade barriers, unexpected changes in legislative or regulatory requirements of foreign countries into which we sell our products, difficulties in obtaining export licenses for our products or in overcoming other trade barriers, laws and business practices favoring local companies, political and economic instability, including conflicts and tensions involving Russia and China and the Israel-Hamas war, difficulties protecting or procuring intellectual property rights, and restrictions resulting in delivery delays and significant taxes or other burdens of complying with a variety of foreign laws.

Changes in the value of the relevant currencies may affect the cost of certain items required in our operations. Changes in currency exchange rates may also affect the relative prices at which we are able to sell products in the same market. Our revenue from international customers may be negatively impacted as increases in the U.S. dollar relative to our international customers' local currency could make our products more expensive, impacting our ability to compete. Our costs of materials from international suppliers may increase if in order to continue doing business with us they raise their prices as the value of the U.S. dollar decreases relative to their local currency. Foreign policies and actions regarding currency valuation could result in actions by the United States and other countries to offset the effects of such fluctuations. The recent global financial downturn has led to a high level of volatility in foreign currency exchange rates and that level of volatility may continue, which could adversely affect our business, financial condition or results of operations.

Our international business could expose us to business, regulatory, political, operational, financial, and economic risks associated with doing business outside of the United States.

Engaging in international business inherently involves a number of difficulties and risks, including:

- required compliance with existing and changing foreign regulatory requirements and laws that are or may be applicable to our business in the future, such as the European Union's General Data Protection Regulation, including as implemented in the UK (GDPR), and other data privacy requirements, labor and employment regulations, anti-competition regulations, the U.K. Bribery Act of 2010 and other anti-corruption laws;
- required compliance with U.S. laws such as the FCPA, and other U.S. federal laws and regulations, including those established by the Office of Foreign Asset Control;
- export requirements and import or trade restrictions;
- laws and business practices favoring local companies;
- foreign currency exchange fluctuations, longer payment cycles and difficulties in enforcing agreements and collecting accounts receivables through certain foreign legal systems;
- hyperinflation or economic or political instability in foreign countries, including the outbreak of war in the Ukraine or the Middle East;
- changes in social, economic, and political conditions or in laws, regulations and policies governing foreign trade, manufacturing, research and development, and investment, including as a result of the separation of the United Kingdom from the European Union, commonly referred to as Brexit;
- the imposition of inconsistent laws or regulations;
- changes in or interpretations of foreign law that may adversely affect our ability to sell our products, perform services or repatriate profits to the United States;
- potentially adverse tax consequences, tariffs, customs charges, bureaucratic requirements and other trade barriers;
- difficulties and costs of staffing and managing foreign operations; and
- difficulties protecting, maintaining, enforcing or procuring intellectual property rights.

If one or more of these risks occurs, it could require us to dedicate significant resources to remedy such occurrence, and if we are unsuccessful in finding a solution, our financial results will suffer.

We may be subject to fines or other penalties for potential past violations of U.S. export control and economic sanctions laws.

Our international business activities must comport with U.S. export controls and other international trade restraints, including the U.S. Department of Commerce's Export Administration Regulations and economic sanctions regulations administered by the U.S. Treasury Department's Office of Foreign Assets Control.

In late 2021, following a voluntary internal review of our compliance with U.S. export control and sanctions laws, we became aware that certain of our products had been sold indirectly into embargoed countries via our distributors and resellers, potentially in violation of U.S. export control and economic sanctions laws. These laws restrict or prohibit the sale of certain products, including our BioXp systems, into certain countries, including Russia. In the past, we may have exported products prior to receiving these required authorizations. We believe that these potential violations were inadvertent and occurred because we and certain of our resellers did not have sufficient compliance procedures in place to prevent the transactions at issue. As a result, we were unable to preclude certain of our channel partners and resellers from selling our solutions into countries subject to a U.S. embargo until late 2021. Commencing in late 2021, we took a series of corrective actions intended to remediate the effect of any unauthorized past actions, including actions to permanently stop supporting the use of our BioXp systems in sanctioned countries. On April 3, 2023, the U.S. Department of Commerce, Bureau of Industry and Security issued a warning letter closing its investigation of this matter. The warning letter stated that based on the facts and circumstances, the matter is closed with no further action required. Should we have similar issues arise in the future, the U.S. government may reconsider its decision to close this matter.

We are subject to various U.S. and international anti-corruption laws and other anti-bribery and anti-money laundering laws and regulations.

We are subject to the FCPA, the U.S. domestic bribery statute contained in 18 U.S.C. § 201, the U.S. Travel Act, and other anti-corruption, anti-bribery, and anti-money laundering laws in the jurisdictions where we do business, both domestic and abroad. Anti-corruption and anti-bribery laws have been enforced aggressively in recent years and are interpreted broadly. These laws generally prohibit companies, their employees, business partners, third-party intermediaries, representatives, and agents from authorizing, offering, or providing, directly or indirectly, improper payments or benefits to government officials or commercial parties to obtain or retain business, direct business to any person, or gain any improper advantage. We sometimes leverage third parties to conduct our business abroad. We and our employees, business partners, third-party intermediaries, representatives, and agents may have direct or indirect interactions with officials and employees of government agencies or state-owned or affiliated entities and we may be held liable for their corrupt or other illegal activities even if we do not explicitly authorize those activities. We cannot assure you that our employees and agents will not take actions that violate applicable law, for which we may be ultimately held responsible. These laws also require that we keep accurate books and records and maintain internal accounting controls and compliance procedures designed to prevent any such actions. While we have policies and procedures to address compliance with these laws, we cannot assure you that our employees, business partners, third-party intermediaries, representatives, and agents will not take actions that violate our policies or applicable law, for which we may be ultimately held responsible. Our exposure for violating these laws increases as our international presence expands and as we increase sales and operations in foreign jurisdictions.

Any violation of the FCPA or other applicable anti-bribery, anti-corruption, and anti-money laundering laws could result in whistleblower complaints, adverse media coverage, investigations, loss of export privileges, severe criminal or civil sanctions, settlements, prosecution, enforcement actions, fines, damages, or suspension or debarment from government contracts, all of which may have an adverse effect on our reputation, business, stock price, financial condition, prospects, and results of operations. In addition, responding to any investigation or action will likely result in a materially significant diversion of management's attention and resources and significant defense costs and other professional fees.

Risks Related to Our Regulatory Environment

If we elect to label and promote any of our products as clinical diagnostics tests or medical devices, we would be required to obtain prior approval or clearance by the U.S. Food and Drug Administration (FDA), which would take significant time and expense and could fail to result in FDA clearance or approval for the intended uses we believe are commercially attractive.

Our products are currently labeled and promoted, and are, and in the near-future will be, sold primarily to academic and research institutions and research companies as research use only (RUO) products. They are not currently designed, or intended to be used, for clinical diagnostic tests or as medical devices. If we elect to label and market our products for use as, or in the performance of, clinical diagnostics in the United States, thereby subjecting them to FDA regulations as medical devices, we would be required to obtain premarket 510(k) clearance or premarket approval from the FDA, unless an exception applies.

We may in the future register with the FDA as a medical device manufacturer and list some of our products with the FDA pursuant to an FDA Class I listing for general purpose laboratory equipment. While this regulatory classification is exempt from certain FDA requirements, such as the need to submit a premarket notification commonly known as a 510(k), and some of the requirements of the FDA's Quality System Regulations (QSRs), we would be subject to ongoing FDA "general controls," which include compliance with FDA regulations for labeling, inspections by the FDA, complaint evaluation, corrections and removals reporting, promotional restrictions, reporting adverse events or malfunctions for our products, and general prohibitions against misbranding and adulteration.

In addition, we may in the future submit 510(k) premarket notifications to the FDA to obtain FDA clearance of certain of our products. It is possible, in the event we elect to submit 510(k) applications for any of our products, that the FDA would take the position that a more burdensome premarket application, such as a premarket approval application or a de novo application, is required for those same products. If such applications were required, greater time and investment would be required to obtain FDA approval. Even if the FDA agreed that a 510(k) was appropriate, FDA clearance can be expensive and time consuming. Notwithstanding the effort and expense, FDA clearance or approval could be denied for some or all of our products for which we choose to market as a medical device or a clinical diagnostic device. There can be no assurance that future products for which we may seek premarket clearance or approval will be approved or cleared by FDA or a comparable foreign regulatory authority on a timely basis, if at all, nor can there be assurance that labeling claims will be consistent with our anticipated claims or adequate to support continued adoption of such products. Compliance with FDA or comparable foreign regulatory authority regulations would require substantial costs, and subject us to heightened scrutiny by regulators and substantial penalties for failure to comply with such requirements or the inability to market our products. The lengthy and unpredictable premarket clearance or approval process, as well as the unpredictability of the results of any required clinical studies, may result in our failing to obtain regulatory clearance or approval to market such products, which would significantly harm our business, results of operations, reputation, and prospects.

If we sought and received regulatory clearance or approval for any of our products, we would be subject to ongoing FDA obligations and continued regulatory oversight and review, including the general controls listed above and the FDA's QSRs for our development and manufacturing operations. We could also be subject to additional FDA post-marketing obligations for such products, any or all of which would increase our costs and divert resources away from other projects. If we sought and received regulatory clearance or approval and are not able to maintain regulatory compliance with applicable laws, we could be prohibited from marketing our products for use as, or in the performance of, clinical diagnostics and be subject to enforcement actions, including warning letters and adverse publicity, fines, injunctions, and civil penalties, recalls or seizure of products, operating restrictions and criminal prosecution.

In addition, we could decide to seek regulatory clearance or approval for certain of our products in countries outside of the United States. Sales of such products outside the United States will likely be subject to foreign regulatory requirements, which can vary greatly from country to country. As a result, the time required to obtain clearances or approvals outside the United States may differ from that required to obtain FDA clearance or approval and we may not be able to obtain foreign regulatory approvals on a timely basis or at all. In the European Union, we would need to comply with the new Medical Device Regulation 2017/745 and In Vitro Diagnostic Regulation 2017/746, which went into application on May 26, 2021 and May 26, 2022 respectively. In March 2023, the European Commission extended the transition timelines for MDR and IVDR for manufacturers of certain medical devices. This will increase the difficulty of regulatory approvals in Europe in the future. In addition, the FDA regulates exports of medical devices. Failure to comply with these regulatory requirements or obtain and maintain required approvals, clearances and certifications could impair our ability to commercialize our products for diagnostic use outside of the United States.

Our products could become subject to government regulation as medical devices by the FDA and other regulatory agencies even if we do not elect to seek regulatory clearance or approval to market our products for diagnostic purposes, which would adversely impact our ability to market and sell our products and harm our business. If our products become subject to FDA regulation, the regulatory clearance or approval and the maintenance of continued and post-market regulatory compliance for such products will be expensive, time-consuming and uncertain both in timing and in outcome.

We do not currently expect our workflow automation and reagent solutions to be subject to the clearance or approval of the FDA, as it is not intended to be used for the diagnosis, treatment or prevention of disease. However, as we expand our product line and the applications and uses of our current or products into new fields, certain of our future products could become subject to regulation by the FDA, or comparable international agencies, including requirements for regulatory clearance or approval of such products before they can be marketed. Also, even if our products are labeled, promoted and intended as RUO, the FDA or comparable agencies of other countries could disagree with our conclusion that our products are intended for research use only or deem our sales, marketing and promotional efforts as being inconsistent with RUO products. For example, our customers may independently elect to use our RUO labeled products in their own laboratory developed tests (LDTs) for clinical diagnostic use, which could subject our products to government regulation, and the regulatory clearance or approval and maintenance process for such products may be uncertain, expensive, and time-consuming. Regulatory requirements related to marketing, selling and distribution of RUO products could change or be uncertain, even if clinical uses of our RUO products by our customers were done without our consent. If the FDA or other regulatory authorities assert that any of our RUO products are subject to regulatory clearance or approval, our business, financial condition, or results of operations could be adversely affected.

The FDA has historically exercised enforcement discretion in not enforcing the medical device regulations against laboratories offering LDTs. FDA recently proposed a rulemaking that would subject LDTs to a new and phased-in regulatory framework. This rule, if finalized, or if there are any other significant changes in the way that the FDA regulates any LDTs that our customers develop using our RUO components could affect our business. If the FDA requires laboratories to undergo premarket review, as proposed, and

comply with other applicable FDA requirements in the future, the cost and time required to commercialize an LDT will increase substantially, and may reduce the financial incentive for laboratories to develop LDTs, which could reduce demand for our RUO applications and products.

As manufacturers develop more complex diagnostic tests and diagnostic software, the FDA may increase its regulation of LDTs. Any future legislative or administrative rule making or oversight of LDTs, if and when finalized, may impact the sales of our products and how customers use our products, and may require us to change our business model in order to maintain compliance with these laws. We cannot predict how these various efforts will be resolved, how Congress or the FDA will regulate LDTs in the future, or how that regulatory system will impact our business. Changes to the current regulatory framework, including the imposition of additional or new regulations, including regulation of our products, could arise at any time during the development or marketing of our products, which may negatively affect our ability to obtain or maintain FDA or comparable regulatory approval of our products, if required. Further, sales of devices for diagnostic purposes may subject us to additional healthcare regulation and enforcement by the applicable government agencies. Such laws include, without limitation, state and federal anti-kickback or anti-referral laws, healthcare fraud and abuse laws, false claims laws, privacy and security laws, Physician Payments Sunshine Act and related transparency and manufacturer reporting laws, and other laws and regulations applicable to medical device manufacturers.

Additionally, on November 25, 2013, the FDA issued Final Guidance "Distribution of In Vitro Diagnostic Products Labeled for Research Use Only." The guidance emphasizes that the FDA will review the totality of the circumstances when it comes to evaluating whether equipment and testing components are properly labeled as RUO. The final guidance states that merely including a labeling statement that the product is for research purposes only will not necessarily render the device exempt from the FDA's clearance, approval, and other regulatory requirements if the circumstances surrounding the distribution, marketing and promotional practices indicate that the manufacturer knows its products are, or intends for its products to be, used for clinical diagnostic purposes. These circumstances may include written or verbal sales and marketing claims or links to articles regarding a product's performance in clinical applications and a manufacturer's provision of technical support for clinical applications.

As part of the United States' efforts to combat COVID-19 and consistent with Executive Orders 13771 and 13924, the Department of Health and Human Services (HHS) announced rescission of guidance and other informal issuances of the FDA regarding premarket review of LDT absent notice-and-comment rulemaking, stating that, absent notice-and-comment rulemaking, those seeking approval or clearance of, or an emergency use authorization, for an LDT may nonetheless voluntarily submit a premarket approval application, premarket notification or an Emergency Use Authorization request, respectively, but are not required to do so. In November 2021, HHS under the Biden administration issued a statement that withdrew the August 2020 policy announcement, stating that HHS does not have a policy on LDTs that is separate from FDA's longstanding approach. Legislative and administrative proposals to amend the FDA's oversight of LDTs have been introduced in recent years, including the VALID Act. In September 2022, Congress passed the FDA user fee reauthorization legislation without substantive FDA policy riders, including the VALID Act, but Congress may revisit the policy riders and enact other FDA programmatic reforms in the future. It is unclear how future legislation by federal and state governments and FDA regulation will impact the industry, including our business and that of our customers. Any restrictions on LDTs by the FDA, HHS, Congress or state regulatory authorities may decrease the demand for our products. Additionally, compliance with additional regulatory burdens could be time consuming and costly for us, our partners and customers. The adoption of new restrictions on RUO products, whether by the FDA or Congress, could adversely affect demand for our products. Further, we could be required to obtain premarket clearance or approval before we can sell our products to certain customers.

Ethical, legal and social concerns surrounding the use of genetic information could reduce demand for our technology.

Our products may be used to create DNA sequences of humans, agricultural crops and other living organisms. Our products could be used in a variety of applications, which may have underlying ethical, legal and social concerns. Governmental authorities could, for safety, social or other purposes, impose limits on or implement regulation of the use of gene synthesis. Such concerns or governmental restrictions could limit the use of our DNA synthesis products, which could have a material adverse effect on our business, financial condition and results of operations. In addition, public perception about the safety and environmental hazards of, and ethical concerns over, genetically engineered products and processes could influence public acceptance of our technologies, products and processes. These concerns could result in increased expenses, regulatory scrutiny, delays or other impediments to our programs.

We use biological and hazardous materials that require considerable expertise and expense for handling, storage and disposal and may result in claims against us.

We work with materials, including chemicals, biological agents, and compounds and DNA samples that could be hazardous to human health and safety or the environment. Our operations and research and development processes also produce hazardous and biological waste products. Federal, state and local laws and regulations govern the use, generation, manufacture, storage, handling and

disposal of these materials and wastes. Compliance with applicable environmental laws and regulations is expensive, and current or future environmental laws and regulations may restrict or have a material effect on our operations and research and development programs. If we do not comply with applicable regulations, we may be subject to fines and penalties.

In addition, accidental injury or contamination from these materials or wastes could interrupt our commercialization efforts, research and development programs and business operations, as well as cause environmental damage resulting in costly clean-up and liabilities under applicable laws and regulations. Furthermore, environmental laws and regulations are complex, change frequently and have tended to become more stringent. We cannot predict the impact of such changes and cannot be certain of our future compliance.

While our property insurance policy provides limited coverage in the event of contamination from hazardous and biological products and the resulting cleanup costs, we do not currently have any additional insurance coverage for legal liability for claims arising from the handling, storage or disposal of hazardous materials. Accordingly, in the event of contamination or injury, we could be liable for damages or penalized with fines in an amount exceeding our resources, and our operations could be suspended or otherwise adversely affected. We may not be able to maintain insurance on acceptable terms, if at all.

We could inadvertently develop DNA sequences or engage in other activity that contravenes biosecurity requirements, or regulatory authorities could promulgate more far reaching biosecurity requirements that our standard business practices cannot accommodate, which could give rise to substantial legal liability, impediments to our business and reputational damage.

The Federal Select Agent Program (FSAP) involves rules administered by the Centers for Disease Control and Prevention and the Animal and Plant Health Inspection Service that regulate possession, use and transfer of biological select agents and toxins that have the potential to pose a severe threat to public, animal or plant health or to animal or plant products.

We have established a biosecurity program under which we follow biosafety and biosecurity best practices and avoid DNA synthesis activities that implicate FSAP rules; however, we could inadvertently fail to comply with FSAP or other biosecurity rules. In addition, authorities could promulgate new biosecurity requirements that restrict our operations. One or more resulting legal penalties, restraints on our business or reputational damage could have material adverse effects on our business and financial condition.

We are currently subject to, and may in the future become subject to additional, U.S. federal and state laws and regulations imposing obligations on how we collect, store and process personal information. Our actual or perceived failure to comply with such obligations could harm our business. Ensuring compliance with such laws could also impair our efforts to maintain and expand our future customer base, and thereby decrease our revenue.

In the ordinary course of our business, we currently, and in the future will, collect, store, transfer, use or process sensitive data, including personally identifiable information of employees, and intellectual property and proprietary business information owned or controlled by ourselves and other parties. The secure processing, storage, maintenance, and transmission of this critical information are vital to our operations and business strategy. We are, and may increasingly become, subject to various laws and regulations, as well as contractual obligations, relating to data privacy and security in the jurisdictions in which we operate. The regulatory environment related to data privacy and security is increasingly rigorous, with new and constantly changing requirements applicable to our business, and enforcement practices are likely to remain uncertain for the foreseeable future. These laws and regulations may be interpreted and applied differently over time and from jurisdiction to jurisdiction, and it is possible that they will be interpreted and applied in ways that may have a material adverse effect on our business, financial condition, results of operations and prospects. Compliance with these laws and regulations is difficult, constantly evolving, time consuming, and requires a flexible privacy framework and substantial resources. Compliance efforts will likely be an increasing and substantial cost in the future.

We are in a continuing process of clarifying evolving compliance requirements and updating our compliance measures. We currently have in place policies and procedures related to the storage, collection and processing of information, and are in the process of conducting internal and external data privacy reviews, to evaluate and advance our compliance with all applicable data protection laws and regulations. We do not currently have policies and procedures in place for assessing our third-party vendors' compliance with applicable data protection laws and regulations. All of these evolving compliance and operational requirements impose significant costs, such as costs related to organizational changes, implementing additional protection technologies, training employees and engaging consultants, which are likely to increase over time. In addition, such requirements may require us to modify our data processing practices and policies, distract management or divert resources from other initiatives and projects, all of which could have a material adverse effect on our business, financial condition, results of operations and prospects. Any failure or perceived failure by us or our third-party vendors, collaborators, contractors and consultants to comply with any applicable federal, state or similar foreign laws and regulations relating to data privacy and security, or could result in damage to our reputation, as well as proceedings or litigation by governmental agencies or other third parties, including class action privacy litigation in certain jurisdictions, which would subject us to significant fines, sanctions, awards, penalties or judgments, all of which could have a material adverse effect on our business, financial condition, results of operations and prospects.

Risks Related to Our Intellectual Property

If we are unable to obtain and maintain sufficient intellectual property protection for our products and technology, or if the scope of the intellectual property protection obtained is not sufficiently broad, our competitors could develop and commercialize products similar or identical to ours, and our ability to successfully commercialize our products and build a strong brand identity may be impaired.

We rely on patent protection as well as trademark, copyright, trade secret and other intellectual property rights protection and contractual restrictions to protect our proprietary products and technologies. Each of these types of measures provides limited protection and may not adequately protect our rights or permit us to gain or keep any competitive advantage. If we fail to obtain, maintain and protect our intellectual property, third parties may be able to compete more effectively against us. In addition, we may incur substantial litigation costs in our attempts to enforce our right in, defend against challenges to, or recover or restrict use of our intellectual property.

To the extent our intellectual property offers inadequate protection, or is found to be invalid or unenforceable, we would be exposed to a greater risk of direct competition. If our intellectual property does not adequately cover competitors' products, our competitive position could be adversely affected, as could our business, financial condition, results of operations and prospects. Both the patent application process and the process of managing patent and other intellectual property disputes can be time-consuming and expensive.

Our success depends in large part on our ability to obtain and maintain protection of the intellectual property, particularly patents we may own solely or jointly with, or license from, third parties, in the United States and in other countries of interest, with respect to our products and technologies. However, obtaining and enforcing patents is costly, time-consuming and complex. We may not be able to file and prosecute all necessary or desirable patent applications, or maintain, enforce and license any patents that may issue from such patent applications, at a reasonable cost or in a timely manner or in all jurisdictions. It is also possible that we will fail to identify patentable aspects of our research and development output before it is too late to obtain patent protection. Moreover, we may not develop additional proprietary products, methods and technologies that are patentable. We may not have the right to control the preparation, filing and prosecution of patent applications, or to maintain the rights to patents licensed from or to third parties; such patents and applications may not be prosecuted and enforced by such third parties in our best interests.

The patent position of synthetic biology technology companies is highly uncertain, involves complex legal and factual questions, and has been the subject of much litigation in recent years. Changes in either the patent laws or in interpretations of patent laws in the United States or other jurisdictions may diminish the value of our intellectual property. As a result, the issuance, scope, validity, enforceability, and commercial value of our patent rights are highly uncertain. It is possible that none of our pending patent applications will result in issued patents in a timely fashion or at all, and even if patents are granted, they may not provide a basis for intellectual property protection of commercially viable products or services, may not provide us with any competitive advantages. We cannot predict the breadth of claims that may be granted or enforced in our patents or in third-party patents. It is possible that third parties will design around our current or future patents such that we cannot prevent such third parties from using similar technologies and commercializing similar products to compete with us. Some of our owned or licensed patents or patent applications may be challenged, and we may not be successful in defending any such challenge. Any successful third-party challenge to our patents could result in the narrowing, unenforceability or invalidity of such patents and increased competition with our business. The outcome of patent litigation or other proceeding can be uncertain, and any attempt by us to enforce our patent rights against others or to challenge the patent rights of others may not be successful, or, regardless of success, may take substantial time and result in substantial cost, and may divert our efforts and attention from other aspects of our business. Any of the foregoing events could have a material adverse effect on our business, financial condition and results of operations.

The U.S. law relating to the patentability of certain inventions in the synthetic biology technology industry is uncertain and rapidly changing, which may adversely impact our existing patents or our ability to obtain patents in the future.

Changes in either the patent laws or interpretation of the patent laws in the United States or in other jurisdictions could increase the uncertainties and costs surrounding the prosecution of patent applications and the enforcement or defense of issued patents. The U.S. Congress has recently passed legislation implementing significant changes to U.S. patent law.

Various courts including the U.S. Supreme Court have rendered decisions that impact the patentability and patent eligibility of inventions or discoveries relating to synthetic biology technology, including by narrowing the scope and strength of patent protection in some instances. In light of these developments and depending on actions by the U.S. Congress, the federal courts and the United States Patent and Trademark office (the USPTO), the laws and regulations governing patents could be interpreted and applied, or could change, in unpredictable ways that may have a material adverse effect on our ability to obtain new patents and to defend and enforce our existing patents and patents that we might obtain in the future.

We cannot assure you that our patent portfolio will not be negatively impacted by the current uncertain state of the law, new court rulings or changes in guidance or procedures issued by the USPTO or other patent offices around the world. From time to time, the U.S. Supreme Court, other federal courts, the U.S. Congress or the USPTO may change the standards of patentability, scope and validity of patents in areas including synthetic biology technology and any such changes, or any similar adverse changes in the patent laws and procedures of other jurisdictions, could have a negative impact on our business, financial condition, prospects and results of operations.

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

Filing, prosecuting and defending patents on our products in all countries throughout the world would be prohibitively expensive, and our intellectual property rights in some countries outside the United States can be less extensive than those in the United States.

The laws of some foreign countries do not protect intellectual property rights to the same extent as the laws of the United States. We may encounter difficulties in protecting and defending such rights in foreign jurisdictions. Consequently, we may not be able to prevent third parties from practicing our inventions in competition with us in some or all countries outside the United States, or from selling or importing products made using our inventions in and into the United States or other jurisdictions. Competitors and other third parties may use our technologies in jurisdictions where we have not obtained patent protection to develop their own products and technologies and may also export infringing products to territories where we do have patent protection but where enforcement may not be as strong as in the United States. Our patents or other intellectual property rights may not be effective or sufficient to prevent such third-party products from competing with our products. In addition, certain countries have compulsory licensing laws under which a patent owner may be compelled to grant licenses to other parties. Furthermore, many countries limit the enforceability of patents against certain kinds of third parties, including government agencies or government contractors. In these countries, the patent owner may have limited remedies, which could materially diminish the value of any patents.

Many companies have encountered significant problems in protecting and defending intellectual property rights in foreign jurisdictions. The legal systems of many other countries do not favor the enforcement of patents and other intellectual property protection, which could make it difficult for us to gain any meaningful competitive advantage from our patents or other intellectual property rights. The legal systems in certain countries may also favor state-sponsored or domestic companies over foreign companies, even though we may have patents and other intellectual property protection in these countries. The absence of harmonized intellectual property protection laws makes it difficult to ensure consistent treatment and enforcement of patent, trade secret, and other intellectual property rights on a worldwide basis. As a result, it is possible that we will not be able to enforce our rights against third parties that misappropriate our proprietary technology or otherwise violate our intellectual property rights in any given country around the world.

Proceedings to enforce our patent rights in foreign jurisdictions could result in substantial cost and divert our efforts and attention from other aspects of our business, could put our patents at risk of being invalidated or interpreted narrowly and our patent applications at risk of not issuing, and could provoke third parties to assert claims against us. We may not prevail in any lawsuits that we initiate, or that are initiated against us, and any damages or other remedies awarded to us may not be commercially meaningful. In addition, changes in the law and legal decisions by courts in foreign countries may affect our ability to obtain adequate protection for our products, services and other technologies and the enforcement of intellectual property. Accordingly, our efforts to enforce our intellectual property rights around the world may be inadequate to obtain a significant commercial advantage from the intellectual property that we develop or license. Any of the foregoing events could have a material adverse effect on our business, financial condition, results of operations and prospects.

Issued patents covering our products could be found invalid or unenforceable if challenged.

Our owned and licensed patents and patent applications may be subject to validity, enforceability and priority disputes. The issuance of a patent is not conclusive as to its inventorship, scope, validity or enforceability. Some of our patents or patent applications (including licensed patents and patent applications) may be challenged in opposition, interference or derivation, ex parte re-examination, inter partes review, post-grant review or other similar proceedings. Any successful third-party challenge to our patents in this or any other proceeding could result in the unenforceability or invalidity of such patents, which may lead to increased competition to our business, which could have a material adverse effect on our business, financial condition, results of operations and prospects. In addition, if we initiate legal proceedings against a third party to enforce a patent covering our products, the defendant could counterclaim that the patent we are asserting in the proceeding is invalid or unenforceable. In patent litigation in the United States, defendant counterclaims alleging invalidity or unenforceability are commonplace. There are numerous grounds upon which a third party can assert invalidity or unenforceability of a patent. Third parties may also raise similar claims before administrative bodies in the United States or abroad, outside the context of litigation per se. Such proceedings could result in revocation of or amendment to our patents in such a way that they no longer protect our products. The outcome following legal assertions of invalidity and unenforceability during patent litigation is unpredictable. If a defendant or other third party were to prevail on a legal assertion of

invalidity or unenforceability, we would lose at least part, and perhaps all, of the patent protection on certain aspects of our products and technologies, which could have a material adverse effect on our business, financial condition, results of operations and prospects. In addition, if the breadth or strength of protection provided by our patents and patent applications is threatened, regardless of the outcome, it could dissuade companies from collaborating with us to license intellectual property or to develop or commercialize current or future products.

We may not be aware of all third-party intellectual property rights potentially relevant to our products, technology and services. Publications of discoveries in the scientific literature lag behind the discoveries, and patent applications in the United States and other jurisdictions are typically not published until approximately 18 months after the earliest effective filing date or, in some cases, not until such patent applications issue as patents. We might not have been the first to make the inventions claimed in each of our pending patent applications and we might not have been the first to file patent applications for these inventions. To determine the priority of these inventions, we may have to participate in interference or derivation proceedings in the U.S. or analogous proceedings in non-U.S. jurisdictions, which could result in substantial cost to us and the loss of valuable patent protection. No assurance can be given that other patent applications will not have priority over our patent applications. In addition, changes to the patent laws of the United States allow for various post-grant proceedings that have not been extensively tested, and their outcome is therefore uncertain. Furthermore, if third parties bring these proceedings against our patents, regardless of the merit of such proceedings and regardless of whether we are successful, we could experience significant costs and our management may be distracted. Any of the foregoing events could have a material adverse effect on our business, financial condition, results of operations and prospects.

If we are unable to protect the confidentiality of our trade secrets, the value of our technology could be materially adversely affected and our business could be harmed.

We rely heavily on trade secrets and confidentiality agreements to protect our unpatented know-how, technology and other proprietary information and to maintain our competitive position. However, trade secrets and know-how can be difficult to protect. In particular, we expect that with respect to our technologies, certain know how will over time be disseminated within the industry through independent development, the publication of journal articles describing the methodology, and the movement of personnel from academic to industry scientific positions.

In addition to pursuing patents on our technology, we take steps to protect our intellectual property and proprietary technology by entering into agreements, including confidentiality agreements, non-disclosure agreements and intellectual property assignment agreements, with our employees, consultants, academic institutions, corporate partners and, when needed, our advisers. However, we cannot be certain that such agreements have been entered into with all relevant parties, and we cannot be certain that our trade secrets and other confidential proprietary information will not be disclosed or that competitors or other third parties will not otherwise gain access to our trade secrets or independently develop substantially equivalent information and techniques. For example, any of the foregoing parties may breach the agreements and disclose our proprietary information, including our trade secrets, and we may not be able to obtain adequate remedies for such breaches. Such agreements may not be enforceable or may not provide meaningful protection for our trade secrets or other proprietary information in the event of unauthorized use or disclosure or other breaches of the agreements, and we may not be able to prevent such unauthorized disclosure, which could adversely impact our ability to establish or maintain a competitive advantage in the market, business, financial condition, results of operations and prospects.

Monitoring unauthorized disclosure is difficult, and we cannot guarantee that the steps we have taken to prevent such disclosure are adequate. If we were to enforce a claim that a third party had wrongfully obtained and was using our trade secrets, it could be expensive and time-consuming, it could distract our personnel, and the outcome would be unpredictable. In addition, courts outside the United States may be less effective in protecting trade secrets.

We also seek to preserve the integrity and confidentiality of our confidential proprietary information by maintaining physical security of our premises and physical and electronic security of our information technology systems, but it is possible that these security measures could be breached. If any of our confidential proprietary information were to be lawfully obtained or independently developed by a competitor or other third party, absent patent protection, we would have no right to prevent such competitor from using that technology or information to compete with us, which could harm our competitive position. Competitors or third parties could purchase our products and attempt to replicate the competitive advantages we derive from our development efforts with their own competitive technologies that fall outside the scope of our intellectual property rights. They might also independently develop our technologies without reference to our trade secrets. If any of our trade secrets were to be disclosed to or independently discovered by a competitor or other third party, it could materially and adversely affect our business, financial condition, results of operations and prospects.

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

We may be subject to claims that former employees, collaborators or other third parties have an interest in our owned or in-licensed patents, trade secrets or other intellectual property as an inventor or co-inventor. For example, we may have inventorship or ownership disputes arising from conflicting obligations of employees, consultants or others who are involved in developing our products. In addition, counterparties to our consulting, sponsored research, software development and other agreements may assert that they have an ownership interest in intellectual property developed under such arrangements. In particular, certain software development agreements pursuant to which third parties have developed parts of our proprietary software may not include provisions that expressly assign to us ownership of all intellectual property developed for us by such third parties. Furthermore, certain of our sponsored research agreements pursuant to which we provide research services for third parties do not assign to us all intellectual property developed under such agreements. As such, we may not have the right to use all such developed intellectual property under such agreements, we may be required to obtain licenses from third parties and such licenses may not be available on commercially reasonable terms or at all, or they may be non-exclusive. If we are unable to obtain such licenses and such licenses are necessary for the development, manufacture and commercialization of our products and technologies, we may need to cease the development, manufacture and commercialization of our products and technologies. Litigation may be necessary to defend against these and other claims challenging inventorship or ownership of our owned or in-licensed patents, trade secrets or other intellectual property. If we fail in defending any such claims, in addition to paying monetary damages, we may lose valuable intellectual property rights. In such an event, we may be required to obtain licenses from third parties and such licenses may not be available on commercially reasonable terms or at all, or they may be non-exclusive. If we are unable to obtain and maintain such licenses, we may need to cease the development, manufacture and commercialization of the relevant products and technologies. Even if we are successful in defending against such claims, litigation could result in substantial costs and be a distraction to management and other employees, and certain customers or partners may defer engaging with us until the particular dispute is resolved. Any of the foregoing could have a material adverse effect on our business, financial condition, results of operations and prospects.

We may not be able to protect and enforce our trademarks and trade names, or build name recognition in our markets of interest, thereby harming our competitive position.

The registered or unregistered trademarks or trade names that we use may be challenged, infringed, circumvented, declared generic, opposed, invalidated, cancelled or determined to be infringing on or dilutive of other marks. As a consequence, we may not be able to protect, register or maintain our rights in these trademarks and trade names.

Third parties may have prior rights in, or have filed, and may in the future file, for registration of, trademarks similar or identical to our trademarks in certain markets of interest that may block our ability to use or to register, or that may limit the scope of protection afforded to, our trademarks and trade names in such markets, thereby impeding our ability to protect, register, maintain or enforce our trademarks and trade names in all markets of interest and to build brand identity and possibly leading to litigation risks and market confusion.

If a third party succeeds in registering or developing common law rights in trademarks similar or identical to our trademarks that predate our rights, and if we are not successful in overcoming any objection from the USPTO or such third party based on or in challenging such rights and defending against challenges to our trademarks, we may not be able to use such trademarks to develop brand recognition of our technologies, products or services.

A third party with prior rights in a similar or identical trademark could challenge our use and registration of our trademarks and trade names by filing a trademark infringement court action or by seeking to block or cancel any registration for our trademarks through an opposition, cancellation, invalidity or other administrative proceeding.

The outcome of any such trademark litigation or other proceeding can be uncertain. If we are unable to successfully defend against any such challenge, in addition to not being able to secure or maintain a registration for our trademark, we may be required, including by court order, to cease all further use of such trademark. Moreover, in the case of a trademark infringement action, a court may require us to issue corrective advertising or to take other steps as the court may deem necessary to remove or reduce the risk of consumer confusion, including changing our company name and rebranding our products. Any of these actions could take time, would be expensive and could lead to a loss of brand recognition or customer confusion as a result. The court may also order us to pay damages (actual damages demonstrated at trial and a disgorgement of our profits), including treble damages and attorneys' fees if the court finds that we willfully infringed such third party trademark. Regardless of success, any such litigation or other proceeding may take substantial time and effort and result in substantial cost, and may divert our efforts and attention from other aspects of our business and could have a material adverse effect on our business, financial condition and results of operations.

Further, we have and may in the future enter into agreements with owners of such third party trade names or trademarks to avoid potential trademark litigation, which may limit our ability to use, register or enforce our trade names or trademarks in certain fields of

business or in certain markets or which may place certain other restrictions on the use of our trademarks and trade names that could limit our ability to build a strong brand identity. If we are unable to establish name recognition based on our trademarks and trade names, then we may not be able to compete effectively, and our business, financial condition, results of operations and prospects may be adversely affected.

Patent terms may be inadequate to protect our competitive position on our workflow automation and reagent solutions for an adequate amount of time.

Patents have a limited lifespan. In the United States, if all maintenance fees are timely paid, the basic term of a utility patent is 20 years from its earliest effective non-provisional filing date. In the United States, the basic term of a patent may be lengthened by patent term adjustment, which compensates the patentee for certain administrative delays by the USPTO in examining and granting a patent, and it may be shortened by filing a terminal disclaimer over an earlier expiring patent. Even if a patent covering our products is obtained, once the patent life has expired, we would no longer be able to use the patent to exclude others from making or selling competitive products. If one of our products requires extended development, testing or regulatory review, patent protection for the product might expire soon after or even before the product is commercialized. As a result, our owned and licensed patent portfolio may not provide us with sufficient rights to exclude others from commercializing products similar or identical to ours, which could have a material adverse effect on our business, financial condition and results of operations.

We have and may continue to be involved in lawsuits to defend against third-party claims of infringement, misappropriation or other violations of intellectual property or to protect or enforce our intellectual property, any of which could be expensive, time consuming and unsuccessful, and may prevent or delay our development and commercialization efforts.

Our commercial success depends in part on our ability and the ability of future collaborators to develop, manufacture, market and sell our product and use our products and technologies without infringing, misappropriating or otherwise violating the intellectual property rights of third parties. There is a substantial amount of litigation involving patents and other intellectual property rights in the synthetic biology technology sector, as well as other proceedings for challenging patents, including interference, derivation, *inter partes* review, post grant review, reexamination proceedings, and pre- and post-grant oppositions. We have and may in the future be exposed to, or threatened with, litigation by third parties having patent or other intellectual property rights alleging that our products, manufacturing methods, trademarks, software or technologies infringe, misappropriate or otherwise violate their intellectual property rights. Numerous issued patents and pending patent applications that are owned by third parties exist in the fields in which we are developing our products and technologies. It is not always clear to industry participants, including us, the claim scope that may issue from pending patent applications owned by third parties or which patents cover various types of products, technologies or their methods of use or manufacture. Because of the large number of patents issued and patent applications filed in our fields, there may be a risk that third parties, including our competitors, may allege that they have patent rights encompassing our products, technologies or methods and that we are employing their proprietary technology without authorization.

If third parties, including our competitors, believe that our products or technologies infringe, misappropriate or otherwise violate their intellectual property, such third parties may seek to enforce their intellectual property, including patents against us by filing an intellectual property-related lawsuit, including a patent infringement lawsuit, against us. Even if we believe third-party intellectual property claims are without merit, there is no assurance that a court would find in our favor on questions of misappropriation, infringement, validity, enforceability, or priority. If any third parties were to assert patents against us and we are unable to successfully defend against any such assertion, we may be required, including by court order, to cease the development and commercialization of the infringing products or technology and we may be required to redesign such products and technologies so they do not infringe such patents, which may not be possible or may require substantial monetary expenditures and time. We could also be required to pay damages, which could be significant, including treble damages and attorneys' fees if we are found to have willfully infringed such patents. We could also be required to obtain a license to such patents in order to continue the development and commercialization of the infringing product or technology; however such a license may not be available on commercially reasonable terms or at all, including because certain of these patents are held by or may be licensed to our competitors. Even if such license were available, it may require substantial payments or cross-licenses under our intellectual property rights, and it may only be available on a nonexclusive basis, in which case third parties, including our competitors, could use the same licensed intellectual property to compete with us. Any of the foregoing could have a material adverse effect on our business, financial condition, results of operation or prospects.

We may choose to challenge, including in connection with any allegation of patent infringement by a third party, the validity or enforceability of any third-party patent that we believe may have applicability in our field, and any other third-party patent that may be asserted against us. Such challenges may be brought either in court or by requesting that the USPTO, European Patent Office (EPO), or other patent offices' review the patent claims, such as in an *ex-parte* reexamination, *inter partes* review, post-grant review proceeding or opposition proceeding. However, there can be no assurance that any such challenge by us will be successful. Even if

such proceedings are successful, these proceedings are expensive and may consume our time or other resources, distract our management and technical personnel, and the costs of the proceedings could be substantial.

Third parties, including our competitors, could be infringing, misappropriating or otherwise violating our owned and in-licensed intellectual property rights. Monitoring unauthorized use of our intellectual property is difficult and costly. We may not be able to detect unauthorized use of, or take effective steps to enforce, our intellectual property rights. From time to time, we seek to analyze our competitors' products and services, and may in the future seek to enforce our rights against potential infringement, misappropriation or violation of our intellectual property. However, the steps we have taken to protect our intellectual property rights may not be effective to enforce our rights as against such infringement, misappropriation or violation of our intellectual property. Any inability to meaningfully enforce our intellectual property rights could harm our ability to compete and reduce demand for our products and technologies.

Litigation proceedings may be necessary for us to enforce our patent and other intellectual property rights. In any such proceedings, a court may refuse to stop the other party from using the technology at issue on the grounds that our owned and in-licensed patents do not cover the technology in question. Further, in such proceedings, the defendant could counterclaim that our intellectual property is invalid or unenforceable and the court may agree, in which case we could lose valuable intellectual property rights, which could allow third parties to commercialize technology or products similar to ours and compete directly with us, without payment to us, or could require us to obtain license rights from the prevailing party in order to be able to manufacture or commercialize our products without infringing such party's intellectual property rights, and if we unable to obtain such a license, we may be required to cease commercialization of our products and technologies, any of which could have a material adverse effect on our business, financial condition, results of operations and prospects. The outcome in any such proceedings is unpredictable.

Regardless of whether we are the defending party or the party seeking to enforce rights in any intellectual property-related proceeding, and regardless of outcome, such proceedings that may be necessary in the future could result in substantial costs and diversion of resources and could have a material adverse effect on our business, financial condition, results of operations and prospects. Furthermore, because of the substantial amount of discovery required in connection with intellectual property litigation, there is a risk that some of our confidential information could be compromised by disclosure during this type of litigation. In addition, there could be public announcements of the results of hearings, motions, or other interim proceedings or developments, and if securities analysts or investors perceive these results to be negative, it could have a substantial adverse effect on the price of our common stock. Some of our competitors and other third parties may be able to sustain the costs of such litigation or proceedings more effectively than we can because of their greater financial resources and more mature and developed intellectual property portfolios. We may not have sufficient financial or other resources to adequately conduct these types of litigation or proceedings. Any of the foregoing, or any uncertainties resulting from the initiation and continuation of any litigation, could have a material adverse effect on our ability to raise the funds necessary to continue our operations or could otherwise have a material adverse effect on our business, financial condition, results of operations and prospects. Claims that we have misappropriated the confidential information or trade secrets of third parties could have a similar adverse effect on our business, financial condition, results of operations and prospects.

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

Various official fees, including renewal fees, must be paid to the respective patent authorities to apply for, prosecute, and maintain patents and patent applications. The USPTO and other patent authorities also variously require compliance with a number of procedural and substantive provisions under local law and practice during and sometimes after the patent application process. In many cases, an inadvertent lapse in paying a fee or fulfilling another requirement can be cured by payment of a late fee or by other means in accordance with the applicable rules. However, there are situations in which non-compliance can result in abandonment or lapse of the patent or patent application, resulting in partial or complete loss of patent rights in the relevant jurisdiction. In such an event, our competitors may be able to enter the market without infringing our patents and this circumstance would have a material adverse effect on our business, financial condition, results of operations and prospects.

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

We have employed and expect to employ individuals who were previously employed at universities or at other companies, including our competitors or potential competitors. Although we try to ensure that our employees, consultants, advisors and independent contractors do not use the proprietary information or know-how of others in their work for us, we may be subject to claims that our employees, advisors, consultants or independent contractors have inadvertently or otherwise used or disclosed intellectual property, including trade secrets or other proprietary information, of their former employers or other third parties, or to

claims that we have improperly used or obtained such trade secrets. Litigation may be necessary to defend against these claims. If we fail in defending such claims, in addition to paying monetary damages, we may lose valuable intellectual property rights and face increased competition to our business. Any such litigation or the threat thereof may adversely affect our ability to hire employees or contract with advisors, contractors and consultants. A loss of key research personnel work product could hamper or prevent our ability to commercialize potential products, which could harm our business. Even if we are successful in defending against these claims, litigation could result in substantial costs and be a distraction to management. This type of litigation or proceeding could substantially increase our operating losses and reduce our resources available for development activities. Some of our competitors may be able to sustain the costs of this type of litigation or proceedings more effectively than we can because of their substantially greater financial resources.

In addition, while it is our policy to require our employees and contractors who may be involved in the conception or development of intellectual property to execute agreements assigning such intellectual property to us, we may be unsuccessful in executing such an agreement with each party who, in fact, conceives or develops intellectual property that we regard as our own. The assignment of intellectual property rights may not be self-executing, or the assignment agreements may be breached, and we may be forced to bring claims against third parties, or defend claims that they may bring against us, to determine the ownership of what we regard as our intellectual property. Furthermore, individuals executing agreements with us may have pre-existing or competing obligations to a third party, such as an academic institution, and thus an agreement with us may be disputed or ineffective in perfecting ownership of inventions developed by that individual, which could have a material adverse effect on our business, financial condition, results of operations, and prospects.

Furthermore, we may in the future be subject to claims by former employees, consultants or other third parties asserting an ownership right in our owned or licensed patents or patent applications. An adverse determination in any such proceeding may result in loss of exclusivity or freedom to operate or in patent claims being narrowed, invalidated or held unenforceable, in whole or in part, which could limit our ability to stop others from using or commercializing similar technology, without payment to us, or could limit the duration of the overall patent protection covering our technology and products. Such challenges may also result in our inability to develop, manufacture or commercialize our products without infringing third-party patent rights. Any of the foregoing could harm our business, financial condition, results of operations and prospects.

If we cannot license rights to use technologies on reasonable terms, we may not be able to commercialize new products in the future.

We may identify third-party technology that we may need to license or acquire in order to develop or commercialize our products or technologies, including our workflow automation and reagent solutions. However, we may be unable to secure such licenses or acquisitions. The licensing or acquisition of third-party intellectual property rights is a competitive area, and several more established companies may pursue strategies to license or acquire third-party intellectual property rights that we may consider attractive or necessary. These established companies may have a competitive advantage over us due to their size, capital resources and greater commercialization capabilities. In addition, companies that perceive us to be a competitor may be unwilling to assign or license rights to us.

We also may be unable to license or acquire third-party intellectual property rights on terms that would allow us to make an appropriate return on our investment or at all. In return for the use of a third party's technology, we may agree to pay the licensor royalties based on sales of our products or services. Royalties are a component of cost of products or technologies and affect the margins on our products. We may also need to negotiate licenses to patents or patent applications before or after introducing a commercial product. We may not be able to obtain necessary licenses to patents or patent applications, and our business may suffer if we are unable to enter into the necessary licenses on acceptable terms or at all, if any necessary licenses are subsequently terminated, if the licensor fails to abide by the terms of the license or fails to prevent infringement by third parties, or if the licensed intellectual property rights are found to be invalid or unenforceable.

Intellectual property rights do not necessarily address all potential threats.

The degree of future protection afforded by our intellectual property rights is uncertain because intellectual property rights have limitations, and may not adequately protect our business or permit us to maintain our competitive advantage. For example:

- others may be able to make products that are similar to products and technologies we may develop or utilize similar technology that are not covered by the claims of the patents that we own or license now or in the future;
- we might not have been the first to make the inventions covered by the issued patent or pending patent application that we license or may own in the future;
- we might not have been the first to file patent applications covering certain of our or their inventions;

- others may independently develop similar or alternative technologies or duplicate any of our technologies without infringing, misappropriating or otherwise violating our owned or licensed intellectual property rights;
- it is possible that our pending licensed patent applications or those that we may own in the future will not lead to issued patents;
- issued patents that we hold rights to may be held invalid or unenforceable as a result of legal challenges by our competitors;
- our competitors might conduct research and development activities in countries where we do not have patent rights and then use the information learned from such activities to develop competitive products for sale in our major commercial markets;
- we may not develop additional proprietary technologies that are patentable;
- the patents of others may harm our business; and
- we may choose not to file a patent for certain trade secrets or know-how, and a third party may subsequently file a patent covering such intellectual property.

Should any of these events occur, they could materially adversely affect our business, financial condition, results of operations and prospects.

Risks Related to Ownership of Our Common Stock

The market price of our common stock has been highly volatile and may continue to be volatile in the future, which could result in substantial losses for investors purchasing our common stock in the market.

The market price of our common stock has been highly volatile since our initial public offering and may continue to be volatile. As a result, you may not be able to sell your common stock at or above the price at which you purchased the stock. Some of the factors that may cause the market price of our common stock to continue fluctuating include, but are not limited to:

- actual or anticipated fluctuations in our operating results, including fluctuations in our quarterly and annual results;
- operating expenses being more than anticipated;
- our ability to comply with the covenants under our 2022 Loan Agreements;
- our ability to raise capital if and when needed;
- supply chain and production disruption due to our moving primary manufacturing facilities to our San Diego facility;
- the failure or discontinuation of any of our product development and research programs;
- changes in the structure or funding of research at academic and research laboratories and institutions, including changes that would affect their ability to purchase our products;
- the success of existing or new competitive businesses or technologies;
- announcements about new research programs or products of our competitors;
- developments or disputes concerning patent applications, issued patents or other proprietary rights;
- the recruitment or departure of key personnel;
- litigation and governmental investigations involving us, our industry or both;
- regulatory or legal developments in the United States and other countries;
- variations in market conditions in the synthetic biology technology sector;
- investor perceptions of us or our industry;
- changes in estimates or recommendations by securities analysts, if any, that cover our common stock or companies that are perceived to be similar to us;
- whether our financial results meet the expectations of securities analysts or investors;
- the level of expenses related to any of our research and development programs or products;
- actual or anticipated changes in our estimates as to our financial results or development timelines;

- variations in our financial results or those of companies that are perceived to be similar to us;
- the announcement or expectation of additional financing efforts;
- sales of our common stock by us or sales of our common stock by our insiders or other stockholders;
- general economic, industry and market conditions, including deteriorating market conditions due to investor concerns regarding inflation and the outbreak of war in the Ukraine and the Middle East; and
- the pandemics, natural disasters or major catastrophic events.

Recently, stock markets in general, and the market for life sciences technology companies in particular, have experienced significant price and volume fluctuations that have often been unrelated or disproportionate to changes in the operating performance of the companies whose stock is experiencing those price and volume fluctuations. Broad market and industry factors may seriously affect the market price of our common stock, regardless of our actual operating performance. Following periods of such volatility in the market price of a company's securities, securities class action litigation has often been brought against that company. Because of the potential volatility of our stock price, we may become the target of securities litigation in the future. Securities litigation could result in substantial costs and divert management's attention and resources from our business.

Our directors, officers and principal stockholders have significant voting power and may take actions that may not be in the best interests of our other stockholders.

Following the closing of the Redeemable Convertible Preferred Stock Financing in June 2023, as of December 31, 2023, our directors, officers and stockholders holding 5% or more of our outstanding common stock and their affiliates beneficially owned over 84% of our outstanding common stock in the aggregate, assuming the conversion of all Redeemable Convertible Preferred Stock and exercise of all options and warrants beneficially held by such persons. As a result, these stockholders, if they act together, will be able to exert significant influence over the management and affairs of our company and most matters requiring stockholder approval, including the election of directors and approval of significant corporate transactions. This concentration of ownership may have the effect of delaying or preventing a change in control, might adversely affect the market price of our common stock and may not be in the best interests of our other stockholders.

Sales of a substantial number of shares of our common stock by our existing stockholders could cause the price of our common stock to decline.

Sales of a substantial number of shares of our common stock in the public market could occur at any time or the perception in the market that the holders of a large number of shares of common stock intend to sell shares and could reduce the market price of our common stock.

Holders of an aggregate of 15,079,329 shares of our common stock issued prior to our initial public offering have rights, subject to conditions, to require us to file registration statements with the SEC covering their shares or to include their shares in registration statements that we may file for ourselves or other stockholders. We filed a registration statement on Form S-3 on July 27, 2023 covering 30,042,550 shares of common stock underlying the Redeemable Convertible Preferred Stock and accompanying Warrants issued in the Private Placement, which was subsequently declared effective on August 3, 2023. We are required to keep this registration statement effective pursuant to the terms of the Registration Rights Agreement dated June 5, 2023 that we entered into with the investors in the Private Placement. We also have registered all shares of common stock that we may issue under our equity compensation and employee stock purchase plans, making them freely tradeable in the public market upon issuance and, if applicable, vesting, subject to volume limitations applicable to affiliates. Sales of common stock in the public market as restrictions end or pursuant to registration rights may make it more difficult for us to sell equity securities in the future at a time and at a price that we deem appropriate. These sales also could cause the trading price of our common stock to fall and make it more difficult for you to sell shares of our common stock.

We identified a material weakness in our internal control over financial reporting as of December 31, 2023 and this or other material weaknesses could continue to materially impair our ability to report accurate financial information in a timely manner.

As of December 31, 2023, the Company's management, with the participation of its principal executive officer and principal financial officer, has evaluated the effectiveness of its disclosure controls and procedures as defined in Rules 13a-15(e) and 15d-15(e) under the Exchange Act. Based on such evaluation, the principal executive officer and principal financial officer have concluded that the Company's disclosure controls and procedures were not effective as of December 31, 2023 due to the identified material weakness in internal control over financial reporting as discussed below.

Management is responsible for establishing and maintaining adequate internal control over financial reporting (as defined in Rules 13a-15(f) and 15d-15(f) of the Exchange Act). Management, under the supervision and with the participation of the principal executive officer and principal financial officer, conducted an assessment of the effectiveness of internal control over financial reporting as of December 31, 2023, based on the framework and criteria established in Internal Control - Integrated Framework (2013) issued by the Committee of Sponsoring Organizations of the Treadway Commission (the COSO framework). Based on this assessment, management concluded that, as of December 31, 2023, its internal control over financial reporting was not effective due to the existence of the material weakness described below.

A material weakness is a deficiency, or a combination of deficiencies, in internal control over financial reporting, such that a reasonable possibility exists that a material misstatement of the annual or interim financial statements would not be prevented or detected on a timely basis. Management identified a combination of deficiencies in the Company's internal control over financial reporting that in the aggregate gave rise to a material weakness. The deficiencies primarily related to limited finance, accounting, and IT staffing levels not commensurate with the Company's complexity and its financial accounting and reporting requirements. The Company continued to undergo organizational changes in 2023, including multiple reductions in workforce and the resulting decision to operate with very lean finance, accounting and IT departments. Despite the hiring of a new Chief Financial Officer and a Corporate Controller in September 2023 and a Sarbanes-Oxley Act compliance firm in the fourth quarter of 2023, the timing and ongoing transitions associated with these changes caused the Company to lack the resources to fully monitor and operate its internal controls over financial reporting as of December 31, 2023, resulting in several deficiencies being discovered during its annual auditing process.

Based on the above, the Company did not fully implement components of the COSO framework, including elements of the control environment, risk assessment, control activities, information and communication, and monitoring activities components.

Management continues to evaluate the material weakness discussed above and is implementing its remediation plan as further described in Item 9A below. However, assurance as to when the remediation efforts will be complete cannot be provided and the material weakness cannot be considered remedied until the applicable controls have operated for a sufficient period of time and management has concluded, through testing, that these controls are operating effectively. Management cannot provide assurances that the measures that have been taken to date, and are continuing to be implemented, will be sufficient to remediate the material weakness identified or to avoid potential future material weaknesses.

We do not expect to pay any dividends for the foreseeable future. Investors may never obtain a return on their investment.

You should not rely on an investment in our common stock to provide dividend income. We do not anticipate that we will pay any dividends to holders of our common stock in the foreseeable future. Instead, we plan to retain any earnings to maintain and expand our existing operations, fund our research and development programs and continue to invest in our commercial infrastructure. In addition, the terms of our Redeemable Convertible Preferred Stock and our our 2022 Loan Agreements with MidCap contain, and any future credit facility or financing we obtain may contain, terms prohibiting or limiting the amount of dividends that may be declared or paid on our common stock. Accordingly, investors must rely on sales of their common stock after price appreciation, which may never occur, as the only way to realize any return on their investment. As a result, investors seeking cash dividends should not purchase our common stock.

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

The trading market for our common stock relies in part on the research and reports that industry or securities analysts publish about us or our business. We do not currently have and may never obtain extensive research coverage by industry or securities analysts. If more analysts do not commence coverage of us, the trading price of our common stock could decrease. If one or more of the analysts covering our business downgrade their evaluations of our common stock, the price of our common stock could decline. If one or more of these analysts cease to cover our common stock, we could lose visibility in the market for our common stock, which in turn could cause the price of our common stock to decline.

Our amended and restated bylaws designate a state or federal court located within the State of Delaware as the exclusive forum for substantially all disputes between us and our stockholders, and also provide that the federal district courts will be the exclusive forum for resolving any complaint asserting a cause of action arising under the Securities Act, each of which could limit our stockholders' ability to choose the judicial forum for disputes with us or our directors, officers, stockholders, or employees.

Our amended and restated certificate of incorporation specifies that, unless we consent in writing to the selection of an alternative forum, the sole and exclusive forum for (a) any derivative action or proceeding brought on our behalf, (b) any action asserting a claim of breach of a fiduciary duty owed by any of our current or former directors, stockholders, officers, or other employees to us or our stockholders, (c) any action or proceeding asserting a claim arising pursuant to, or seeking to enforce any right,

obligation or remedy under, any provision of the Delaware General Corporation Law, our amended and restated certificate of incorporation, or our amended and restated bylaws, (d) any action or proceeding as to which the Delaware General Corporation Law confers jurisdiction on the Court of Chancery of the State of Delaware, or (e) any action or proceeding asserting a claim that is governed by the internal affairs doctrine shall be the Court of Chancery of the State of Delaware (or, if the Court of Chancery does not have jurisdiction, another state court in Delaware or, if no state court in Delaware has jurisdiction, the federal district court for the District of Delaware) and any appellate court therefrom, in all cases subject to the court having jurisdiction over the claims at issue and the indispensable parties; provided that the exclusive forum provision will not apply to suits brought to enforce any liability or duty created by the Exchange Act.

Section 22 of the Securities Act creates concurrent jurisdiction for federal and state courts over all such Securities Act actions. Accordingly, both state and federal courts have jurisdiction to entertain such claims. To prevent having to litigate claims in multiple jurisdictions and the threat of inconsistent or contrary rulings by different courts, among other considerations, our amended and restated bylaws also provide that the federal district courts of the United States of America will be the exclusive forum for resolving any complaint asserting a cause of action arising under the Securities Act.

Any person or entity purchasing or otherwise acquiring or holding or owning (or continuing to hold or own) any interest in any of our securities shall be deemed to have notice of and consented to the foregoing bylaw provisions. Although we believe these exclusive forum provisions benefit us by providing increased consistency in the application of Delaware law and federal securities laws in the types of lawsuits to which each applies, the exclusive forum provisions may limit a stockholder's ability to bring a claim in a judicial forum of its choosing for disputes with us or any of our directors, officers, stockholders, or other employees, which may discourage lawsuits with respect to such claims against us and our current and former directors, officers, stockholders, or other employees. Our stockholders will not be deemed to have waived our compliance with the federal securities laws and the rules and regulations thereunder as a result of our exclusive forum provisions. Further, in the event a court finds either exclusive forum provision contained in our amended and restated bylaws to be unenforceable or inapplicable in an action, we may incur additional costs associated with resolving such action in other jurisdictions, which could harm our results of operations.

Delaware law and provisions in our amended and restated certificate of incorporation and amended and restated bylaws might discourage, delay or prevent a change in control of our company or changes in our management and, therefore, depress the trading price of our common stock.

Our status as a Delaware corporation and the anti-takeover provisions of the Delaware General Corporation Law may discourage, delay or prevent a change in control by prohibiting us from engaging in a business combination with an interested stockholder for a period of three years after the person becomes an interested stockholder, even if a change of control would be beneficial to our existing stockholders. In addition, our restated certificate of incorporation and restated bylaws contain provisions that may make the acquisition of our company more difficult, including the following:

- our board of directors is classified into three classes of directors with staggered three-year terms and directors will only be able to be removed from office for cause by the affirmative vote of holders of at least a majority of the voting power of our then outstanding capital stock;
- certain amendments to our amended and restated certificate of incorporation will require the approval of a majority of our board of directors and stockholders holding two-thirds of the voting power of our then outstanding capital stock;
- stockholder-proposed amendments to our amended and restated bylaws will require the approval of a majority of the stockholders entitled to vote, except certain provisions would require the affirmative vote of stockholders holding two-thirds of the voting power of our then outstanding capital stock;
- our stockholders will only be able to take action at a meeting of stockholders and will not be able to take action by written consent for any matter;
- vacancies on our board of directors will be able to be filled only by our board of directors and not by stockholders;
- only the chair of the board of directors, chief executive officer, president or a majority of the board of directors are authorized to call a special meeting of stockholders;
- certain litigation against us can only be brought in Delaware;
- our restated certificate of incorporation authorizes undesignated preferred stock, the terms of which may be established and shares of which may be issued, without the approval of the holders of our capital stock; and
- advance notice procedures apply for stockholders to nominate candidates for election as directors or to bring matters before an annual meeting of stockholders.

These anti-takeover defenses could discourage, delay, or prevent a transaction involving a change in control of our company. These provisions could also discourage proxy contests and make it more difficult for stockholders to elect directors of their choosing and to cause us to take other corporate actions they desire, any of which, under certain circumstances, could limit the opportunity for our stockholders to receive a premium for their shares of our capital stock and could also affect the price that some investors are willing to pay for our common stock.

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

As of December 31, 2023, we had U.S. federal and state net operating loss carryforwards (NOLs) of $109.6 million and $76.0 million, respectively. The federal NOLs of $1.3 million, generated before January 1, 2018, will begin to expire in 2034, but can be used to offset up to 100% of taxable income. Amounts generated after December 31, 2017 will carryforward indefinitely, but will be subject to a 80% taxable income limitation beginning in tax years after December 31, 2020, as provided by the Coronavirus Aid, Relief, and Economic Security Act (CARES Act). State NOLs, if not utilized, will begin to expire in 2029. We may use these NOLs to offset against taxable income for U.S. federal and state income tax purposes. Additionally, Section 382 of the Internal Revenue Code of 1986, as amended (the Code), may limit the NOLs we may use in any year for U.S. federal income tax purposes in the event of certain changes in ownership of our company. A Section 382 "ownership change" generally occurs if one or more stockholders or groups of stockholders who own at least 5% of a company's stock increase their ownership by more than 50 percentage points over their lowest ownership percentage within a rolling three-year period. Similar rules may apply under state tax laws. We have not conducted a 382 study to determine whether the use of our NOLs is impaired. We may have previously undergone an "ownership change." In addition, future issuances or sales of our stock, including certain transactions involving our stock that are outside of our control, could result in future "ownership changes." "Ownership changes" that have occurred in the past or that may occur in the future could result in the imposition of an annual limit on the amount of pre-ownership change NOLs and other tax attributes we can use to reduce our taxable income, potentially increasing and accelerating our liability for income taxes, and also potentially causing those tax attributes to expire unused. States may impose other limitations on the use of our NOLs. Any limitation on using NOLs could, depending on the extent of such limitation and the NOLs previously used, result in our retaining less cash after payment of U.S. federal and state income taxes during any year in which we have taxable income, rather than losses, than we would be entitled to retain if such NOLs were available as an offset against such income for U.S. federal and state income tax reporting purposes, which could adversely impact our operating results.

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

We are an "emerging growth company," as defined in the JOBS Act. For so long as we remain an emerging growth company, we are permitted by SEC rules and plan to rely on exemptions from certain disclosure requirements that are applicable to other SEC registered public companies that are not emerging growth companies. These exemptions include not being required to comply with the auditor attestation requirements of Section 404 of the Sarbanes Oxley Act, not being required to comply with any requirement that may be adopted by the Public Company Accounting Oversight Board regarding mandatory audit firm rotation or a supplement to the auditor's report providing additional information about the audit and the financial statements, reduced disclosure obligations regarding executive compensation and exemptions from the requirements of holding a nonbinding advisory vote on executive compensation and stockholder approval of any golden parachute payments not previously approved. As a result, the information we provide stockholders will be different than the information that is available with respect to other public companies. To the extent that we continue to qualify as a "smaller reporting company," as such term is defined in Rule 12b-2 under the Exchange Act, after we cease to qualify as an emerging growth company, we will continue to be permitted to make certain reduced disclosures in our periodic reports and other documents that we file with the SEC. We cannot predict whether investors will find our common stock less attractive if we 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 price may be more volatile.

In addition, the JOBS Act provides that an emerging growth company can take advantage of an extended transition period for complying with new or revised accounting standards. This allows an emerging growth company to delay the adoption of certain accounting standards until those standards would otherwise apply to private companies. We have elected to avail ourselves of this exemption from new or revised accounting standards and, therefore, we will not be subject to the same new or revised accounting standards as other public companies that are not emerging growth companies. As a result, our financial statements may not be comparable to companies that comply with new or revised accounting pronouncements as of public company effective dates.

We incur significantly increased costs and management resources as a result of operating as a public company, and our management is required to devote substantial time to new compliance initiatives.

As a public company, we incur significant legal, accounting, compliance and other expenses and these expenses may increase even more after we are no longer an "emerging growth company." Our management and other personnel need to devote a substantial

amount of time and incur significant expense in connection with compliance initiatives. As a public company, we also bear all of the internal and external costs of preparing and distributing periodic public reports in compliance with our obligations under the securities laws.

In addition, regulations and standards relating to corporate governance and public disclosure, including the Sarbanes Oxley Act, and the related rules and regulations implemented by the SEC and Nasdaq, have increased legal and financial compliance costs and will make some compliance activities more time-consuming. We intend to invest resources to comply with evolving laws, regulations and standards, and this investment will result in increased general and administrative expenses and may divert management's time and attention from our other business activities. If our efforts to comply with new laws, regulations and standards differ from the activities intended by regulatory or governing bodies due to ambiguities related to practice, regulatory authorities may initiate legal proceedings against us, and our business may be harmed. In the future, it may be more expensive or more difficult for us to obtain director and officer liability insurance as a public company, and we may be required to accept reduced coverage or incur substantially higher costs to obtain coverage.

These factors could also make it more difficult for us to attract and retain qualified members of our board of directors, particularly to serve on our audit committee and compensation committee, and qualified executive officers.

We may be subject to securities litigation, which is expensive and could divert management attention.

The market price of our common stock has been and may continue to be volatile. The stock market in general, and the Nasdaq Stock Market and life sciences technology companies in particular, have experienced extreme price and volume fluctuations that have often been unrelated or disproportionate to the operating performance of these companies. In the past, companies that have experienced volatility in the market price of their stock have been subject to securities class action litigation. We may be the target of this type of litigation in the future. Securities litigation against us could result in substantial costs and divert our management's attention from other business concerns, which could seriously harm our business.

If we fail to maintain an effective system of internal control over financial reporting, we may not be able to accurately report our financial results in a timely manner or prevent fraud, which would adversely affect investor confidence in our company and harm our business.

Effective internal controls over financial reporting are necessary for us to provide reliable financial reports and, together with adequate disclosure controls and procedures, are designed to prevent fraud. Any failure to implement required new or improved controls, or difficulties encountered in their implementation, could cause us to fail to meet our reporting obligations in a timely manner, or at all. Testing by us conducted in connection with Section 404(a) of the Sarbanes Oxley Act may reveal material weaknesses in our internal controls over financial reporting related to our limited finance, accounting and IT staffing levels. While the Company is implementing its remediation plan as further described in Item 9A below, management cannot provide assurances that the measures that have been taken to date, and are continuing to be implemented, will be sufficient to remediate the material weakness identified or to avoid potential future materials weaknesses. Subsequent testing by our independent registered public accounting firm in connection with Section 404(b) of the Sarbanes Oxley Act may reveal continued or additional deficiencies in our internal controls over financial reporting that are deemed to be significant deficiencies or material weaknesses or that may require prospective or retroactive changes to our financial statements or identify other areas for further attention or improvement. Ineffective internal controls could also cause investors to lose confidence in our reported financial information, which could have a negative effect on the trading price of our common stock.

We are required to disclose material changes made in our internal controls over financing reporting and procedures on a quarterly basis and our management are required to assess the effectiveness of these controls annually. We are also required to make a formal assessment of the effectiveness of our internal control over financial reporting, and once we cease to be an emerging growth company or a non-accelerated filer, we will be required to include an attestation report on internal control over financial reporting issued by our independent registered public accounting firm. However, for as long as we are an "emerging growth company" under the JOBS Act or a non-accelerated filer, our independent registered public accounting firm will not be required to attest to the effectiveness of our internal controls over financial reporting pursuant to Section 404(b) of the Sarbanes-Oxley Act.

To achieve compliance with Section 404(a) of the Sarbanes-Oxley Act, we engage in a process to document and evaluate our internal control over financial reporting, which is both costly and challenging. In this regard, we will need to implement our remediation plan, continue to dedicate internal resources, potentially engage additional outside consultants to assess the adequacy of our internal control over financial reporting, continue steps to improve control processes as appropriate, validate through testing that controls are designed and operating effectively and implement a continuous reporting and improvement process for internal control over financial reporting.

As of December 31, 2023, we have determined that our disclosure controls and procedures were not effective due to the identified material weakness in internal control and financial reporting as described herein. The effectiveness of our internal controls in future periods is subject to the risk that our controls may become further inadequate because of changes in conditions. We may be unable to timely remediate our material weakness and may discover additional weaknesses in our system of internal financial and accounting controls and procedures that could result in a material misstatement of our financial statements. Our internal control over financial reporting will not prevent or detect all errors and all fraud. A control system, no matter how well designed and operated, can provide only reasonable, not absolute, assurance that the control system's objectives will be met. Because of the inherent limitations in all control systems, no evaluation of controls can provide absolute assurance that misstatements due to error or fraud will not occur or that all control issues and instances of fraud will be detected.

If we are not able to comply with the requirements of Section 404 of the Sarbanes-Oxley Act in a timely manner, or if we are unable to maintain proper and effective internal controls over financial reporting, we may not be able to produce timely and accurate financial statements. If that were to happen, our investors could lose confidence in our reported financial information, the market price of our stock could decline and we could be subject to sanctions or investigations by the SEC or other regulatory authorities including equivalent foreign authorities.

If our estimates or judgments relating to our critical accounting policies are based on assumptions that change or prove to be incorrect, our results of operation could fall below our publicly announced guidance or the expectations of securities analysts and investors, resulting in a decline in the market price of our common stock.

The preparation of financial statements in conformity with U.S. GAAP requires management to make estimates and assumptions that affect the amounts reported in our financial statements and accompanying notes. We base our estimates on historical experience and estimates and on various other assumptions that we believe to be reasonable under the circumstances, the results of which form the basis for making judgments about the carrying values of assets, liabilities, equity, revenue and expenses that are not readily apparent from other sources. For example, in connection with the implementation of the new revenue accounting standard related to product sales, management makes judgments and assumptions based on our interpretation of the new standard. The new revenue standard is principle-based and interpretation of those principles may vary from company to company based on their unique circumstances. It is possible that interpretation, industry practice and guidance may evolve as we apply the new standard. If our assumptions underlying our estimates and judgments relating to our critical accounting policies change or if actual circumstances differ from our assumptions, estimates or judgments, our operating results may be adversely affected and could fall below our publicly announced guidance or the expectations of securities analysts and investors, resulting in a decline in the market price of our common stock.

Risks Related to Our Private Placement of Redeemable Convertible Preferred Stock and Accompanying Warrants

Sales of shares of our common stock underlying the Redeemable Convertible Preferred Stock and Warrants issued in our recent private placement may cause the market price of our shares to decline.

In connection with the Private Placement, we issued 280,000 shares of Redeemable Convertible Preferred Stock, which are convertible at any time into shares of our common stock at an agreed conversion rate. In addition, we issued Warrants to purchase an aggregate of 18,127,196 shares of our common stock. We granted the holders of Redeemable Convertible Preferred Stock and accompanying Warrants certain demand, shelf and "piggyback" registration rights with respect to the shares of common stock issuable upon conversion of the Redeemable Convertible Preferred Stock and/or exercise of the accompanying Warrants. Upon the effectiveness of such registration statement on August 3, 2023, the shares of common stock issuable upon conversion of the Redeemable Convertible Preferred Stock and/or exercise of the accompanying Warrants may be freely sold in the open market. The sale of a significant amount of these shares in the open market or the perception that these sales may occur could cause the market price of our common stock to decline or become highly volatile.

The issuance of shares of our Redeemable Convertible Preferred Stock reduced the relative voting power of holders of our common stock and dilutes the ownership of such holders.

Holders of our Redeemable Convertible Preferred Stock are entitled to vote, on an as-converted basis, together with holders of our common stock on all matters submitted to a vote of the holders of our common stock. As a result, the issuance of the Redeemable Convertible Preferred Stock effectively reduces the relative voting power of the holders of our common stock. Moreover, the conversion of the Redeemable Convertible Preferred Stock to shares of our common stock would dilute the ownership interest of existing holders of our common stock, and any sales in the public market of our common stock issuable upon conversion of the Redeemable Convertible Preferred Stock could adversely affect prevailing market prices of our common stock. Sales by such holders of a substantial number of shares of our common stock in the public market, or the perception that such sales might occur, could have a material adverse effect on the price of our common stock.

The holders of shares of the Redeemable Convertible Preferred Stock may exercise significant influence over us.

Notwithstanding the application of the conversion blockers contained in the Certificate of Designation that governs the Redeemable Convertible Preferred Stock and the terms of the Warrants, holders of the Redeemable Convertible Preferred Stock and accompanying Warrants owned approximately 81% of our shares of common stock on an as-converted basis as of September 30, 2023. Holders of our Redeemable Convertible Preferred Stock are entitled to vote, on an as-converted basis, together with holders of our common stock on all matters submitted to a vote of the holders of our common stock. As a result, the holders of shares of the Redeemable Convertible Preferred Stock have the ability to significantly influence the outcome of any matter submitted for the vote of the holders of our common stock.

In addition, under the terms of the Certificate of Designation that governs the Redeemable Convertible Preferred Stock, the Redeemable Convertible Preferred Stock generally ranks, with respect to liquidation, dividends and redemption, senior to other securities and, so long as any shares of Redeemable Convertible Preferred Stock remain outstanding, the approval of the holders of a majority of the Redeemable Convertible Preferred Stock is required (with the exception of (i), which requires the consent of a 75% supermajority of the Redeemable Convertible Preferred Stock) in order for the Company to, among other things, (i) amend, modify or fail to give effect to any right of holders of the Redeemable Convertible Preferred Stock, (ii) change the authorized number of Redeemable Convertible Preferred Stock, (iii) create a new class or series of equity securities or securities convertible into equity securities with equal or superior rights, preferences or privileges to those of the Redeemable Convertible Preferred Stock in terms of liquidation preference or dividend rights, (iv) issue shares of common stock or securities convertible into common stock while we have insufficient shares to effect the conversion of the Redeemable Convertible Preferred Stock into common stock, (v) declare or pay dividends or redeem or repurchase any capital stock (other than certain repurchases from employees, directors, advisors or consultants upon termination of service) or (v) create any U.S. subsidiary that is not majority-owned by the Company, except for joint ventures created in the ordinary course of business or foreign subsidiaries created for regulatory purposes.

One of the holders of Redeemable Convertible Preferred Stock was also granted a one-time right to nominate a director, pursuant to which Paul Meister was appointed to the Company's board of directors. Mr. Meister was replaced by Greg Herrema on October 18, 2023. Mr. Herrema joined Andrea Jackson and Todd Nelson on our board of directors as directors affiliated with or appointed by holders of Redeemable Convertible Preferred Stock. Notwithstanding the fact that all directors are subject to fiduciary duties to us and to applicable law, the interests of these directors could potentially differ from the interests of our security holders as a whole or of our other directors.

The holders of Redeemable Convertible Preferred Stock have rights, preferences and privileges that are not held by, and are preferential to, the rights of our common stockholders.

Upon the consummation of (i) a reorganization, merger or consolidation of the Company, (ii) the sale lease, transfer, or exclusive license or other disposition by the Company or any of its subsidiaries of all or substantially all of the assets of the Company, (iii) the issuance or transfer of shares of capital stock of the Company representing at least 50% of the voting power of the voting securities of the Company, or (iv) the completion of any tender offer or exchange offer pursuant to which the holders of common stock are permitted to sell their shares equaling 50% or more of the outstanding common stock for other securities, cash or property (each a "Deemed Liquidation Event") that occurs prior to the second anniversary of the closing of the Private Placement, the holders of each share of Redeemable Convertible Preferred Stock is entitled to receive, in preference to the holders of the common stock and any junior preferred stock, an amount per share equal to the greater of (a) 200% multiplied by the sum of the Accrued Value plus an amount equal to all accrued or declared and unpaid dividends on the Redeemable Convertible Preferred Stock that have not previously been added to the Accrued Value, or (b) the amount that such shares would have been entitled to receive if they had converted into common stock immediately prior to such Deemed Liquidation Event. Upon the consummation of a Deemed Liquidation Event that occurs on or after the second anniversary of the closing of the Private Placement, or any voluntary or involuntary liquidation, dissolution, winding up of the Company that is not a Deemed Liquidation Event (each a "Liquidation Event"), the holders of each share of Redeemable Convertible Preferred Stock is entitled to receive, in preference to the holders of the common stock and any junior preferred stock, an amount per share equal to the greater of (1) the sum of the Accrued Value plus an amount equal to all accrued or declared and unpaid dividends on the Redeemable Convertible Preferred Stock that have not previously been added to the Accrued Value, or (2) the amount that such shares would have been entitled to receive if they had converted into common stock immediately prior to such Deemed Liquidation Event or Liquidation Event.

These provisions may make it more costly for a potential acquirer to engage in a business combination transaction with us. Provisions that have the effect of discouraging, delaying or preventing a change in control could limit the opportunity for our stockholders to receive a premium for their shares of our common stock and could also affect the price that some investors are willing to pay for our common stock. If there are insufficient assets to pay in full such amounts, then the available assets will be ratably distributed to the holders of the Redeemable Convertible Preferred Stock in accordance with the respective amounts that would be payable on such shares if all amounts payable thereon were paid in full. This will reduce the remaining amount of our assets, if any, available to distribute to holders of our common stock. The holders of Redeemable Convertible Preferred Stock also have a preferential right to receive cumulative dividends on the Accrued Value of each share of Redeemable Convertible Preferred Stock at a

rate of 8% per annum, compounded quarterly whether or not earned or declared, and whether or not there are earnings or profits, surplus or other funds or assets of the Company legally available for the payment of dividends. Dividends on the Redeemable Convertible Preferred Stock are payable in kind and will accrue on the Accrued Value of each share of Redeemable Convertible Preferred Stock until the earlier of conversion, redemption, consummation of a change of control, a liquidation event, or upon failure to mandatorily convert due to the conversion blockers or applicable regulatory restrictions.

In addition, the holders of our Redeemable Convertible Preferred Stock also have certain redemption and conversion rights, including the right to request redemption by the Company after the seventh anniversary of the closing of the Private Placement.

Our obligations to the holders of Redeemable Convertible Preferred Stock could limit our ability to obtain additional financing or increase our borrowing costs, which could have an adverse effect on our financial condition. These preferential rights could also result in divergent interests between the holders of shares of Redeemable Convertible Preferred Stock and holders of our common stock.

Item 1B. Unresolved Staff Comments

None.

Item 1C. Cybersecurity

Our Board of Directors recognizes the critical importance of information security to the Company's operational success. We continue to make substantial investments to augment the capabilities of our people, processes, and technologies in order to address our cybersecurity risks. Our cybersecurity risks are integrated into our overall risk management governance and are reviewed on at least a quarterly basis by the Audit Committee of our Board of Directors and at least annually by the full Board of Directors. The policies, processes and standards designed to mitigate those risks are based on recognized frameworks established by the National Institute of Standards and Technology, and are focused on preserving the confidentiality, security, and availability of information that the Company collects and stores. The Company takes a comprehensive approach to analyzing and mitigating cybersecurity risks, focused on preventing, identifying, mitigating, and responding to cybersecurity threats.

Risk Management and Strategy

Policies and Procedures

As of December 31, 2023, we have implemented a set of comprehensive cybersecurity and data protection policies and procedures. Our comprehensive information security program is based on recognized industry standards covering areas such as risk management, incident response, change management, vendor assessment, data backup, and disaster recovery. Our policies and procedures provide for the prompt escalation and communication of significant cybersecurity incidents so that Company senior management, and where appropriate, the Board of Directors, can make decisions regarding the handling, public disclosure and reporting of such incidents in a timely and effective manner.

Technical Safeguards

We invest in advanced technologies for continuous cybersecurity monitoring across our information technology environment which are designed to prevent, detect, and minimize cybersecurity attacks, as well as alert management of such attacks. These safeguards include firewalls, intrusion prevention, testing and detection tools, anti-malware functionality, software patch management, facility and infrastructure security, system change control, and access controls. Technical safeguards are evaluated and upgraded over time to address risks identified through vulnerability assessments and cybersecurity threat analysis. We have implemented processes to monitor security threats and vulnerabilities and respond to all cybersecurity incidents affecting us.

Testing and Assessments

We conduct periodic reviews and tests of Company policies, processes, and standards designed to address cybersecurity risks and incidents. These efforts include annual vulnerability and penetration testing, audits, and other measures to identify and remediate cybersecurity gaps. The Company engages third parties to perform audits and assessments on our information security control environment and operational effectiveness, including information security maturity assessments. The results of such reviews, audits, and assessments are reported to the Audit Committee and senior management, and the Company makes adjustments to its cybersecurity policies, standards and processes as necessary based on this information. The Company also retains consultants and other advisors to assist in the development and maintenance of cybersecurity and data protection policies and procedures in compliance with applicable regulations and standards.

Incident Response and Recovery Planning

The Company has implemented and maintains detailed incident response and backup and recovery plans designed to fully address the Company's response to a cybersecurity incident. These plans are tested and assessed on a periodic basis.

Third Party Risk Management

The Company has implemented a vendor management procedure to identify, evaluate, and oversee cybersecurity risks posed by third parties, including vendors, service providers and external users of the Company's information systems, as well as third party systems that collect, store or otherwise interact with Company information. The Company conducts vendor assessments to review third party security measures, as well as adherence to relevant industry information security standards.

Education and Awareness

Our employees and contractors receive regular cybersecurity awareness training, including specific topics related to social engineering and email fraud, to communicate the Company's evolving information security policies, procedures, and standards. Employee training includes periodic phishing exercises to provide Company employees with a heightened level of awareness to cybersecurity threats, and to equip them with relevant information to prevent cybersecurity incidents.

Governance

Our Board of Directors' Audit Committee is responsible for overseeing our cybersecurity risk management and strategy. The Company's Director of IT Operations reports to the Audit Committee and other members of management on at least a quarterly basis on cybersecurity risks. These reports provide a comprehensive view of the Company's cybersecurity program, including recent developments, cybersecurity strategy, ongoing assessments of the Company's security posture and cyber threats and risks, results of third party audits and testing, policy and procedure updates, security upgrades and initiatives, risk mitigation strategies, and employee training programs. Under the Company's cybersecurity Incident Response Plan, the Audit Committee and executive management also receive prompt information regarding any incidents that may meet established reporting thresholds, as well as ongoing updates regarding any such incident until it has been fully resolved.

The Company's Director of IT Operations works collaboratively with the Chief Executive Officer (CEO), Chief Financial Officer, (CFO) and Chief Legal Officer (CLO) to implement a thorough program to assess cybersecurity risks and vulnerabilities, protect the Company's information systems from cybersecurity threats, and respond effectively to cybersecurity incidents in accordance with the Company's incident response and recovery plans. Through this program, the Company monitors the prevention, detection, mitigation and remediation of cybersecurity threats in real time, reporting to the Audit Committee when appropriate.

The Director of IT Operations has served in various roles in information technology and security across multiple industries for over 35 years. In addition, the Company retains qualified employees and engages consultants with significant expertise and certifications in cybersecurity relevant to our industry. The Company's CEO, CFO, and CLO each hold degrees relevant to their respective fields, and each have over 25 years of experience managing risks at the Company and at similar companies, including risks arising from cybersecurity threats.

Cybersecurity Threat Disclosure

We are not aware of any cybersecurity threats that have materially affected or are reasonably likely to materially affect the Company's business, results of operations, or financial condition. In the event of a future cybersecurity incident, the Company has procedures in place to identify whether the incident or associated cybersecurity risks have materially affected or are reasonably likely to materially affect the Company, to ensure that disclosures are made where required under applicable law or regulation.

For further discussion of cybersecurity risks, please see Item 1A, "Risk Factors".

Item 2. Properties

Our principal facilities are located at 10421 and 10431 Wateridge Circle in San Diego, California and function as our worldwide headquarters. The facilities comprise approximately 66,223 square feet across the two buildings and are leased from BioMed Realty. The Wateridge lease provides for a 10 year and 3 month term beginning at the lease commencement date and we are entitled to one option to extend the lease term for an additional five years. The buildings contain infrastructure for reagent and equipment

manufacturing and for research and development of new products, as well as for supporting supply chain, logistics and limited office space for administrative and commercial functions. The facilities includes wet labs for both reagent manufacturing and research and development on both floors as well as specialized labs for instrument engineering to support the development of new instruments. A designated instrument services lab space supports our current instrument installed base customers.

In connection with the EtonBio Inc., (Eton) acquisition in November 2021, we assumed a lease of office and laboratory space located at 10179 Huennekens Street, San Diego, California. The facility is approximately 8,600 square feet and was leased from Oberlin Realty LLC. The lease term, as amended, expired in June 2023.

In connection with the Eton acquisition in November 2021, we assumed a lease of office and laboratory space located at 10717 Sorrento Valley Road, San Diego, California. The facility is approximately 8,000 square feet and was leased from Sorrento Realty LLC. The lease term expires in November 2024 and has an option to extend the term for an additional three years at the then current fair market value rental rate for comparable office and laboratory space.

In connection with the Eton acquisition in November 2021, we assumed a lease of office and laboratory space located at 400 Park Offices Drive, Durham County, North Carolina. The facility is approximately 3,000 square feet. and was leased from Frontier Hub, LLC. We recently entered into an amendment pursuant to which the contractual lease term was extended. The lease term as amended expires in October 2026.

In connection with the Eton acquisition in November 2021, we assumed a lease office and laboratory space located at 56 Roland Street, Boston, Massachusetts. The facility is approximately 4,300 square feet and was leased from Paradigm Direct Roland. We have recently entered into an amendment pursuant to which the contractual lease term was extended. The lease term as amended expires in June 2024.

In connection with the Eton acquisition in November 2021, we assumed a lease of office and laboratory space located at 1075 Morris Avenue, Union, New Jersey. The facility is approximately 1,200 square feet and was leased from Institute for Life Sciences Entrepreneurship. We have recently entered into an amendment pursuant to which the contractual lease term was extended. The lease term as amended expires in May 2024.

Item 3. Legal Proceedings

We are subject to various legal proceedings and claims arising in the ordinary course of business. Although occasional adverse decisions or settlements may occur, management believes that the final disposition of such matters will not have a material adverse effect on our business, financial position, results of operations or cash flows.

For information regarding certain current legal proceedings, see "Note 15—*Commitments and Contingencies—Litigation*" in the Notes to Consolidated Financial Statements, which is incorporated herein by reference.

Item 4. Mine Safety Disclosures

Not applicable.

Part II

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

Market Information

Our common stock trades under the symbol "TBIO" on the Nasdaq Global Select Market and has been publicly traded since June 18, 2021. Prior to this time, there was no public market for our common stock.

As of February 13, 2024, there were approximately 37 holders of record of shares of our common stock. The number of record holders is based upon the actual number of holders registered on our books at such date based on information provided by Equinity Trust Company, LLC, our transfer agent, and does not include holders of shares in "street names" or persons, partnerships, associations, corporations or other entities identified in security position listings maintained by depository trust companies.

Dividend Policy

We have never declared or paid any cash dividends on our capital stock. We currently intend to retain any future earnings to fund the development and expansion of our business, and therefore we do not anticipate paying cash dividends on our common stock in the foreseeable future. Any future determination to pay dividends will be at the discretion of our board of directors and will depend on our results of operations, financial condition, capital requirements, contractual restrictions and other factors deemed relevant by our board of directors. Additionally, our 2022 Loan Agreements contain customary covenants, including restrictions on our ability to pay cash dividends. Further, under the terms of our Redeemable Convertible Preferred Stock, we may not declare or pay any dividends on shares of any capital stock.

Under the terms of our Redeemable Convertible Preferred Stock, holders have a right to receive cumulative dividends on the Accrued Value (as defined in Note 11, Redeemable Convertible Preferred Stock, of our notes to financial statements) of each shares of Redeemable Convertible Preferred Stock at a rate of 8% per annum, compounded quarterly whether or not earned or declared, and whether or not there we have earnings or profits, surplus or other funds or assets legally available for the payment of dividends. Dividends on the Redeemable Convertible Preferred Stock are payable in kind and will accrue on the Accrued Value of each share of Redeemable Convertible Preferred Stock until the earlier of conversion, redemption, consummation of a change of control, a liquidation event or upon failure to mandatorily convert due to the conversion blockers or applicable regulatory restrictions. As such dividends compound and shall be added to the Accrued Value on each quarterly dividend date. No dividends are to be paid in cash unless such dividends are paid pursuant to liquidation of the Company or a conversion or redemption of the Redeemable Convertible Preferred Stock.

In the event that our board of directors declares a dividend payable upon the then outstanding shares of our common stock (other than a stock dividend on the common stock payable solely in the form of additional shares of common stock), the holders of the Redeemable Convertible Preferred Stock shall be entitled, in addition to any cumulative dividends to which the Redeemable Convertible Preferred Stock may be entitled, to receive (concurrent with the payment of the dividend to the holders of common stock) the amount of dividends per share of Redeemable Convertible Preferred Stock that would be payable on the number of whole shares of the common stock into which each share of such Redeemable Convertible Preferred Stock held by each holder could be converted, such number to be determined as of the record date for the determination of holders of common stock entitled to receive such dividend.

Unregistered Sales of Equity Securities

None.

Securities Authorized for Issuance Under Equity Compensation Plans

The information required by Item 5 of Form 10-K regarding equity compensation plans will be set forth in the Proxy Statement and is incorporated herein by reference.

Purchases of Equity Securities by the Issuer and Affiliated Purchasers

We did not purchase any of our registered equity securities during the period covered by this Annual Report.

Item 6. Reserved.

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

Unless the context otherwise requires, all references in this section to the "Company," "we," "us, or "our" refer to the business of Telesis Bio Inc. and its subsidiaries.

You should read the following discussion and analysis of our financial condition and results of operations together with our consolidated financial statements and related notes and other financial information included elsewhere 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 and related financing, includes forward-looking statements that involve risks and uncertainties. As a result of many factors, including those factors set forth in the "Risk Factors" and "Special Note Regarding Forward-Looking Statements" sections and elsewhere in this Annual Report, our actual results could differ materially from the results described in or implied by the forward-looking statements contained in the following discussion and analysis.

Overview

We are a leader in automated multi-omic and synthetic biology solutions focused on providing applications to enable researchers to rapidly, accurately and reproducibly build or "write" high-quality synthetic DNA and mRNA that is ready to use in many downstream synthetic biology enabled markets. Our synthetic biology solution addresses the bottlenecks across the multi-step process of building DNA and mRNA, as well as the significant limitations of existing solutions that prevent the rapid building of virtually error-free DNA and mRNA at a useable scale. A key part of our solution are our BioXp systems, end-to-end automated workstations that fit on the benchtop and are broadly accessible due to their ease-of-use and hands-free automation. We believe our BioXp systems can democratize synthetic biology by simplifying the process of building DNA and mRNA, thereby accelerating the discovery, development and production of novel high-value products, including antibody-based biologics, mRNA-based vaccines and therapeutics and precision medicines.

Our on-market and our planned solutions are comprised of the following:

- *BioXp 3250 system*: which we believe is the first commercially available push-button, walkaway, end-to-end automated workstation that empowers researchers to go from a digital DNA sequence to endpoint-ready synthetic DNA in as few as 8 hours and mRNA in less than 24 hours, exclusive of shipment time;
- *BioXp 9600 system*: a walkaway, high throughput end-to-end automated workstation that empowers researchers to go from a digital DNA sequence to endpoint-ready DNA in as few as 8 hours and mRNA in less than 24 hours, exclusive of shipment time, with onboard NGS preparation;
- *BioXp portal*: a user-friendly online portal that offers an intuitive guided workflow, complexity analysis capability and sequence optimization and design tools for building new DNA sequences and assembling them into vector(s) of choice as well as mRNA constructs;
- *BioXp De Novo kits*: will contain all the necessary building blocks and reagents, including our proprietary Gibson Assembly branded reagents, for specific synthetic biology workflow applications to go from in-silico design to end-point product such as DNA or mRNA;
- *BioXp Select kits:* offer customers the ability to use non Telesis Bio DNA while using the BioXp to perform synthetic biology workflow applications such as cloning, mRNA generation and cell free amplification;
- *BioXp Next Generation Sequencing kits:* will contain all the necessary reagents to go from DNA or RNA to a sequencer ready library;
- *Benchtop reagents*: contain all the reagents necessary to proceed with a specific synthetic biology workflow on the benchtop using products generated on the BioXp system; and
- *Custom Gibson Short Oligo Ligation Assembly (SOLA) enzymatic DNA synthesis (EDS) solutions*: is a sustainable, scalable, and cost-effective approach designed to significantly reduce timelines for constructing synthetic DNA, RNA, and proteins compared to traditional chemical synthesis, paving the way for more efficient and effective development of mRNA-based vaccines, diagnostics, therapeutics, and personalized medicines.

We were incorporated in the state of Delaware in March 2011, as Synthetic Genomics Solution, Inc., a wholly owned subsidiary of Synthetic Genomics, Inc. (SGI). We changed our name to SGI-DNA, Inc. (SGI-DNA) in February 2013. On March 8, 2019, SGI sold SGI-DNA to GATTACA Mining, LLC (GATTACA) by entering into a stock purchase agreement to sell all of our outstanding common and preferred stock in exchange for a $10.0 million non-recourse promissory note (the Purchase Note). Subsequently, we focused our efforts on launching new synthetic biology products and expanding our distribution and marketing efforts on our existing research use only products. We changed our name to Codex DNA, Inc. in March 2020 and then to Telesis Bio Inc. in November 2022.

We commercially launched our current synthetic biology solution in September 2019, which now includes the BioXp 3250 and BioXp 9600 systems, BioXp kits with associated cloud-based application scripts, and benchtop reagent kits. From our commercial launch through December 31, 2023, we have placed approximately 300 BioXp systems globally. We target customers in the fields of personalized medicine, biologics drug discovery, vaccine development, genome editing and cell and gene therapy. As of December 31, 2023, our customer base was composed of approximately 500 customers and included 17 of the 25 largest biopharmaceutical companies in the world ranked by 2023 revenue. Our customer base also includes leading academic research institutions, government institutions, CROs and synthetic biology companies.

We estimate that our 2023 product and service sales mix statistics were as follows:

- *Sales mix*: 41% BioXp systems, 20% BioXp kits, and 39% services.
- *Geographic mix*: 77% North America, 14% Europe/Middle East/Africa and 9% Asia Pacific.
- *Distribution mix*: 90% direct sales and 10% distributors.

Since our inception as a stand-alone company on March 8, 2019, we have devoted substantially all of our efforts to raising capital, organizing, and staffing our company, commercializing existing products and developing new products. On June 18, 2021, we completed our initial public offering (IPO) of 7,666,664 shares of common stock, including the exercise in full by the underwriters of their option to purchase up to 999,999 additional shares of common stock, for aggregate gross proceeds of $122.7 million. We received $112.5 million in net proceeds after deducting underwriting discounts and commissions and other offering expenses payable by us. Prior to our IPO, we had funded our operations with proceeds from the issuance of convertible notes and convertible preferred stock, payments received from royalties and product sales, and proceeds from borrowings under our credit facilities. Prior to our IPO, we had received gross proceeds of $32.8 million from sales of our convertible preferred stock, $6.8 million from the issuance of our convertible notes and gross proceeds of $40.0 million through borrowings under our loan and security agreements with Oxford Finance LLC (the 2019 Loan Agreement) and Silicon Valley Bank (the 2021 Loan Agreement). Subsequent to our IPO, we also received $20.0 million through borrowing under our credit, security and guaranty agreements (the 2022 Loan Agreements) with MidCap Financial Trust and MidCap Funding IV Trust (collectively, MidCap) $15.0 million of which was used to repay the loans from Silicon Valley Bank. In June 2023, we received gross proceeds of $28.0 million from the sale of Redeemable Convertible Preferred Stock and Warrants. In November 2023, we repaid $15.0 million under the 2022 Term Loan Agreement and granted MidCap a warrant to purchase 275,000 shares of common stock in exchange for amending our 2022 Term Loan Agreement and waiving any other remedies it may have due to our revenue covenant default.

We have incurred significant operating losses since our inception. During the years ended December 31, 2023 and 2022, our revenue was $27.5 million and $27.4 million, respectively. As of December 31, 2023, we had cash and cash equivalents of $1.7 million and short-term investments of $17.6 million. Our ability to generate product revenue sufficient to achieve profitability will depend on the successful development and commercialization of our products. We reported net losses of $47.7 million and $48.5 million for the years ended December 31, 2023 and 2022, respectively. As of December 31, 2023, we had an accumulated deficit of $161.5 million.

We expect that our cash, cash equivalents, restricted cash and short-term investments of $19.3 million as of December 31, 2023 will not be sufficient to fund our operating expenses for at least twelve months from the date our financial statements were issued. Refer to additional discussion related to going concern considerations in “Liquidity and Capital Resources” and “Going Concern” below.

Acquisition

On November 18, 2021, we entered into a Share Purchase Agreement, with the stockholders of EtonBio Inc. (Eton), pursuant to which we purchased all of the outstanding shares of capital stock of Eton. The total purchase price was approximately $14.1 million, which was funded with our existing cash on hand.

Eton is a San Diego-based biotech company specializing in synthetic biology products and services, including DNA sequencing and oligo synthesis, for the global academic research, pharmaceutical, and biotechnology industries. Eton also markets DNA prep services and products such as antibodies, peptides, and metabolism assay kits.

Components of Results of Operations

Revenue

Revenue consists of product sales, services, collaboration revenue, and royalties and other revenue. Net product sales primarily consist of sales of our BioXp systems, BioXp kits, and benchtop reagents. Service revenue primarily consists of DNA sequencing and

preparation services. Royalties and other revenue consist of fees charged for the license of non-exclusive rights of our patents to third parties and grant revenue received from government entities as reimbursement of expenses related to the development and use of synthetic biology tools to develop solutions to address various areas of concern. The grants typically require the performance of specific activities and timely reporting of results.

Historically, revenue growth has come from BioXp systems and BioXp kits. Growth in BioXp systems sales has come from investments in direct and indirect distribution channels and new product introductions. Growth in BioXp kit sales has come from the growth of the installed base of BioXp systems and new application kits. As we continue to expand our revenue opportunities, we launched our collaboration research program which works with government entities to develop solutions to specific areas of concern.

Collaboration and License Agreement with Pfizer

In December 2021, we entered into a Research Collaboration and License Agreement (Pfizer Agreement) with Pfizer Inc. (Pfizer), pursuant to which we agreed to collaborate with Pfizer to further develop our novel enzymatic DNA synthesis technology for Pfizer's use in its research and development of mRNA-based vaccines and biotherapies. The financial terms of the deal include an upfront payment from Pfizer to us, along with success-based technical milestone payments that could be earned in the near term. We are also eligible to receive additional milestone payments based on the achievement of specified development, regulatory and commercialization goals associated with any products developed from the application of our technology developed and licensed under the agreement.

We granted Pfizer a non-exclusive, worldwide license to use our enzymatic DNA synthesis technology for purposes of researching, developing, manufacturing and commercializing pharmaceutical and biopharmaceutical products and a limited-time option to convert such license to exclusive for specific applications.

Under the Pfizer Agreement, Pfizer has made an upfront payment to us of $8.0 million at the time of execution and a milestone payment of $2.5 million in 2022 as a result of successful completion of our first technical milestone. During the second and fourth quarters of 2023, we achieved, and were subsequently paid for the second and third technical milestones under the same agreement. If we meet certain additional technical milestones defined in the Pfizer Agreement, we will be eligible to receive an additional near-term milestone payment of $2.5 million.

In addition to the upfront payment and technical milestone payments, Pfizer has agreed to make milestone payments to us upon the products meeting certain clinical milestones, with each product (other than exclusive products) being eligible for milestone payments up to $20.0 million if that product were to meet the applicable clinical milestones and the first exclusive product in each exclusive field being eligible for milestone payments up to $55.0 million if that product were to meet the applicable clinical milestones. Pfizer has also agreed to pay us up to $60.0 million in sales milestones for products (other than exclusive products) if aggregate net sales of such products meet certain thresholds and up to $180.0 million in sales milestones for exclusive products if aggregate net sales of the exclusive products meet certain thresholds. Provided the Pfizer Agreement remains in place, Pfizer will also pay escalating royalties from a low to mid-fraction of one percent of net sales of all products. Pfizer's obligations to pay royalties with respect to a product within a country will expire after specific criteria including such product no longer being covered by patent rights licensed to Pfizer by us in such country. Royalty payments are subject to reduction after the introduction by a third party of a biosimilar product in such country.

Cost of Revenue

Cost of revenue primarily consists of material and labor costs, freight and indirect overhead costs associated with sales of our BioXp instruments, BioXp kits, benchtop reagents, services and collaboration research programs. Cost of revenue also includes period costs related to certain inventory adjustment charges, and unabsorbed manufacturing and overhead costs, as well as any write-offs of inventory that fail to meet specification or are otherwise no longer suitable for commercial manufacture. Cost of revenue is expected to increase as revenue increases.

Research and Development Expenses

Research and development expenses include pre-production costs related to the design, development and improvement of our products and technologies, including employee compensation, benefits and related costs of sustaining our engineering teams, project material costs, third party fees paid to consultants, prototype development expenses, legal costs related to intellectual property, patent fees, and other costs incurred in the product design and development process. We expense research and development costs as incurred. Non-refundable advance payments that we make for goods or services to be received in the future are recorded as prepaid expenses.

The prepaid amounts are expensed as the related goods are delivered or the services are performed, or when it is no longer expected that the goods will be delivered or the services rendered.

We expect that our research and development expenses will decrease, both in the near term and subsequently, as we shift our focus to the sales and marketing of our developed products. At this time, we cannot accurately estimate or know the nature, timing and costs of the efforts that will be necessary to complete the development of any of our future products. The successful development and commercialization of our future products is highly uncertain. This is due to the numerous risks and uncertainties associated with product development and commercialization, including but not limited to the following:

- we can never be certain that we can solve any technical challenge;
- if such solution can be found, we can never be certain of the timing of such a solution;
- once we find a technical solution, we cannot be certain that the solution will be commercially feasible; and
- any solution may not be desired by our customers.

These uncertainties with respect to the development of any of our future products could significantly impact the costs and timing associated with the development of these products.

Sales and Marketing Expenses

Sales and marketing expenses include employee compensation and benefits for sales, marketing, customer service, corporate development personnel and related administrative expenses. In addition, sales and marketing expenses also include costs for international employees and facility overhead based on headcount. We anticipate that our sales and marketing expenses will increase in the future as we increase our headcount to support increasing sales and continued expansion of our U.S. and international operations. Sales and marketing costs are expensed as incurred.

General and Administrative Expenses

General and administrative expenses consist primarily of salaries and related costs for personnel in executive, finance, IT, and administrative functions. General and administrative expenses also include legal fees relating to corporate matters; professional fees for accounting, auditing, tax and administrative consulting services; insurance costs, administrative travel expenses, other operating costs; and facility costs not otherwise included in research and development or sales and marketing expenses.

We anticipate that our general and administrative expenses will stay constant in the near term and increase subsequently as we increase our administrative headcount to support our continued commercialization activities. We also anticipate that we will continue to incur significant accounting, audit, legal, regulatory, compliance and director and officer insurance costs as well as investor and public relations expenses associated with operating as a publicly traded company. General and administrative expenses are expensed as incurred.

Goodwill Impairment

We test goodwill for impairment at a reporting unit level on an annual basis, or more frequently if events or changes in circumstances indicate that the carrying amount of a reporting unit's goodwill might be impaired. If the fair value of the reporting unit exceeds the carrying value of its net assets, goodwill is not impaired, and no further testing is required. If the fair value of the reporting unit is less than the carrying value, we measure the amount of impairment loss, if any, as the excess of the carrying value over the fair value of the reporting unit.

Other (Expense) Income, Net

Interest Income

Interest income primarily consists of income earned on our cash equivalents and investment balances.

Interest Expense

Interest expense primarily consists of cash and non-cash interest on our notes payable facilities and our finance leases.

Change in Fair Value of Derivative Liabilities

Change in fair value of derivative liabilities consists of the change in fair value of our contingent put option liability. We classify derivative liabilities as a liability on our consolidated balance sheets that we remeasure to fair value at each reporting date. We recognize changes in the fair value of the derivative liabilities as a component of other (expense) income in our consolidated statements of operations and comprehensive loss. The contingent put option liability related to the 2021 Loan Agreement was extinguished in August 2022 in connection with the paydown and termination of the corresponding term loan. Upon entering into the 2022 Term Loan Agreements, we bifurcated a contingent put option derivative liability related to the acceleration clause triggered upon an event of default. At December 31, 2023, the contingent put option liability is listed as a derivative liability on our consolidated balance sheet.

Other Expense, Net

Other expense, net consists primarily of loss on extinguishment of debt and change in the fair value of derivative liabilities.

Income Taxes

Since our inception, we have not recorded any income tax benefits for the NOLs we have incurred in each year or for our earned research and development tax credits generated in each period, as we believe, based upon the weight of available evidence, that it is more likely than not that all of our NOLs and tax credit carryforwards will not be realized. As of December 31, 2023 and 2022, we had federal NOL carryforwards of $109.6 million and $95.9 million, respectively and state NOL carryforwards of $76.0 million and $70.1 million, respectively. The federal NOL carryforwards of $1.3 million generated before January 1, 2018 will begin to expire in 2034, but can be used to offset up to 100% of taxable income.

Amounts generated after December 31, 2017 will carryforward indefinitely, but will be subject to 80% taxable income limitation beginning in tax years after December 31, 2020, as provided by the CARES Act. We have recorded a full valuation allowance against our net deferred tax assets at each balance sheet date.

On March 27, 2020, the CARES Act was passed by the U.S. Congress and signed into United States law. The CARES Act, among other things, includes certain provisions for individuals and corporations; however, these benefits did not impact our income tax provisions in the years presented given the existence of the full valuation allowance.

Results of Operations

Comparison of the Years Ended December 31, 2023 and 2022

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

	For the Years Ended December 31,		
	2023	2022	Change
		(in thousands)	
Revenue			
Product revenue	$ 9,691	$ 10,913	$ (1,222)
Service revenue	6,291	7,121	(830)
Collaboration revenue	8,690	6,650	2,040
Royalties and other revenue	2,837	2,751	86
Total revenue	27,509	27,435	74
Cost of revenue	10,559	11,840	(1,281)
Gross profit	16,950	15,595	1,355
Operating expenses:			
Research and development	17,496	23,460	(5,964)
Sales and marketing	13,514	16,489	(2,975)
General and administrative	21,090	22,131	(1,041)
Goodwill impairment	11,389	—	11,389
Total operating expenses	63,489	62,080	1,409
Loss from operations	(46,539)	(46,485)	(54)
Other (expense) income, net:			
Interest income	1,743	738	1,005
Interest expense	(3,105)	(1,955)	(1,150)
Change in fair value of derivative liabilities	331	8	323
Loss on extinguishment of debt	—	(727)	727
Other expense, net	(130)	(26)	(104)
Total other expense, net	(1,161)	(1,962)	801
Loss before provision for income taxes	(47,700)	(48,447)	747
Provision for income taxes	(24)	(24)	—
Net loss	$ (47,724)	$ (48,471)	$ 747

Revenue

Revenue for the year ended December 31, 2023 was $27.5 million, compared to $27.4 million for the year ended December 31, 2022. The increase of $0.1 million was primarily driven by an increase in collaboration revenue of $2.0 million, offset by a decrease in product revenue of $1.2 million and a decrease in service revenue of $0.8 million. Collaboration revenue increases were driven by our Pfizer contract. Product revenue from 9600 BioXp instrument and 3250 BioXp instruments decreased by $1.2 million and revenue from BioXp kits remained flat. Service revenue decreased primarily as a result of a $1.1 million impact from pausing our biofoundry services offerings at the end of 2022, offset by a $0.2 million increase in service revenue from our Eton subsidiary.

Cost of Revenue

Cost of revenue for the year ended December 31, 2023 was $10.6 million, compared to $11.8 million for the year ended December 31, 2022. Cost of revenue decreased by $1.3 million despite a slight increase in revenue primarily because a larger portion of our revenue was attributable to royalty and collaboration revenue, while product and service revenues decreased but experienced improved margins. Our gross margin percentage was 62% and 57% of total revenues for the years ended December 31, 2023 and 2022, respectively. The favorable change in gross margin percentage was mainly due to increase in revenue from collaboration research programs, and the sale of kits with higher average margins compared to 2022.

Research and Development Expenses

Research and development expenses for the year ended December 31, 2023 were $17.5 million, compared to $23.5 million for the year ended December 31, 2022. The decrease of $6.0 million was primarily due to lower personnel expenses, consulting and professional services, and lab supplies. Personnel expenses decreased by $3.3 million primarily due to headcount reductions.

Consulting and professional services, as well as lab supplies expense, decreased by $2.7 million, primarily due to product development efforts related to our BioXp 9600 System, which were completed upon the release of this product near the end of the third quarter of 2022.

Sales and Marketing Expenses

Sales and marketing expenses for the year ended December 31, 2023 were $13.5 million compared to $16.5 million for the year ended December 31, 2022. The decrease of $3.0 million was primarily attributable to lower personnel costs of $4.3 million due to headcount reductions and reduced variable compensation, offset by a $1.1 million increase in our allowance for doubtful accounts, as well as $0.3 million in increased facilities costs.

General and Administrative Expenses

General and administrative expenses for the year ended December 31, 2023 were $21.1 million, compared to $22.1 million for the year ended December 31, 2022. The decrease of $1.0 million was primarily due to a $1.8 million decrease in personnel costs due to headcount reductions and reduced executive leadership team compensation, $1.0 million in lower insurance costs due to D&O insurance premium reductions achieved during our third year of being a publicly traded company, and $0.7 million decrease in professional services due to higher utilization of consultants during 2022. This decrease to general and administrative expenses was offset by a $2.8 million increase in lease expense as we were in the process of ending three leases while we consolidated those leases into two buildings at our new corporate headquarters at Wateridge Circle during 2023.

Goodwill Impairment

The sustained decline in the market price of our common stock and the early repayment of $15.0 million under the 2022 Term Loan Agreement lead us to conclude that it was more likely than not that the fair value of one of our reporting units was below its carrying amount. A quantitative goodwill assessment was then performed using a combination of techniques, including an income approach and a market-based approach. Based on the results of the quantitative goodwill assessment, we recorded an impairment charge related to our Eton reporting unit of $11.4 million to reduce the carrying amount of goodwill to $3.5 million as of December 31, 2023. If the market value of our common stock declines further, additional impairment charges may be recorded in the future. For the year ended December 31, 2022, we did not record any impairment of goodwill.

Other (Expense) Income, Net

Other expense, net for the year ended December 31, 2023 was a net expense of $1.2 million, compared to a net expense of $2.0 million for the year ended December 31, 2022. The decrease of $0.8 million was primarily due to a $1.0 million increase in interest income, the absence of a $0.7 million loss on extinguishment of debt from 2022 and a $0.3 million increase to the change in fair value of derivative liabilities, offset by a $1.2 million increase in interest expense.

Liquidity and Capital Resources

Sources of Liquidity

Since our inception, we have incurred significant operating losses. On June 18, 2021, we completed our IPO of 7,666,664 shares of common stock, including the exercise in full by the underwriters of their option to purchase up to 999,999 additional shares of common stock, for aggregate gross proceeds of $122.7 million. We received $112.5 million in net proceeds after deducting underwriting discounts and commissions and other offering expenses payable by us. Prior to our IPO, we had funded our operations with proceeds from the issuance of convertible notes and convertible preferred stock, payments received from royalties and product sales, and proceeds from borrowings under our credit facilities. Prior to our IPO, we had received gross proceeds of $32.8 million from sales of our convertible preferred stock, $6.8 million from the issuance of our convertible notes and gross proceeds of $40.0 million through borrowings under our loan and security agreements with Oxford Finance LLC (the 2019 Loan Agreement) and Silicon Valley Bank (the 2021 Loan Agreement). After completion of our IPO, we received $20.0 million under our credit, security and guaranty agreements with MidCap Financial Trust and MidCap Funding IV Trust (The 2022 Loan Agreements), $15.0 million of which was used to repay the debt under the 2021 Loan Agreement. In June 2023, we received gross proceeds of $28.0 million from the sale of Redeemable Convertible Preferred Stock and Warrants. As of December 31, 2023, we had cash, cash equivalents, and restricted cash of $1.7 million and short-term investments of $17.6 million. In November 2023, we repaid $15.0 million under the

2022 Term Loan Agreement and granted MidCap a warrant to purchase 275,000 shares of common stock in exchange for amending our 2022 Term Loan Agreement and waiving any other remedies it may have due to our revenue covenant default.

We will continue to incur significant expenses and expect to incur operating losses for the foreseeable future. Our expenses and capital expenditures could increase substantially in connection if we:

- seek to develop new products and services and hire additional research, development and engineering personnel;
- expand our distribution and marketing infrastructure to further commercialize current and future products and support our growing customer base;
- add operational, financial, and administrative systems and personnel to support growing sales; and
- maintain, expand, enforce, defend and protect our intellectual property portfolio and provide reimbursement of third-party expenses related to our patent portfolio.

These matters raise substantial doubt about our ability to continue as a going concern within one year from the date of filing this Annual Report. The accompanying consolidated financial statements have been prepared under the assumption we will continue to operate as a going concern, which contemplates the realization of assets and the settlement of liabilities in the normal course of business. The consolidated financial statements do not include any adjustments to reflect the possible future effects on the recoverability and classification of assets or the amounts of liabilities that may result from uncertainty related to our ability to continue as a going concern.

Until such time as we can generate significant revenue from product sales, if ever, we expect to finance our operations through a combination of equity offerings, debt financings, or other capital sources, including collaborations with other companies, and other strategic transactions. To the extent that we raise additional capital through the sale of equity or convertible debt securities, the ownership interest of our stockholders will be or could be diluted, and the terms of these securities may include liquidation or other preferences that adversely affect the rights of our stockholders. Debt financing and equity offerings, if available, may involve agreements that include covenants limiting or restricting our ability to take specific actions, such as incurring additional debt, making capital expenditures or declaring dividends. If we raise funds through collaborations, or other similar arrangements with third parties, we may have to relinquish valuable rights to our technologies, future revenue streams, research programs or products, or grant licenses on terms that may not be favorable to us and/or may reduce the value of our stock. If we are unable to raise additional funds through equity or debt financings when needed, we may be required to delay, limit, reduce or terminate our product development or future commercialization efforts or grant rights to develop and market our products even if we would otherwise prefer to develop and market such products ourselves.

The field of synthetic biology is rapidly developing and subject to numerous risks and uncertainties associated with new technologies and novel products. Consequently, we are unable to accurately predict the timing or amount of increased product sales or expenses or when, or if, we will be able to achieve or maintain profitability. Even if we are able to continue to generate significant product sales, we may not become profitable. If we fail to become profitable or are unable to sustain profitability on a continuing basis, then we may be unable to continue our operations at planned levels and be forced to reduce or terminate our operations.

Cash Flows

Comparison of the Years Ended December 31, 2023 and 2022

The following table summarizes our consolidated cash flows for the years ended December 31, 2023 and 2022:

	For the Years Ended December 31,	
	2023	2022
	(in thousands)	
Net cash used in operating activities	$ (34,667)	$ (38,715)
Net cash used in investing activities	(5,744)	(18,007)
Net cash provided by financing activities	11,565	4,510
Effect of exchange rate fluctuations on cash held	(3)	—
Net decrease in cash, cash equivalents, and restricted cash	$ (28,849)	$ (52,212)

Operating Activities

During the year ended December 31, 2023, we used $34.7 million of cash in operations, primarily resulting from our net loss of $47.7 million and changes in our operating assets and liabilities of $7.8 million, partially offset by non-cash charges of $20.8 million. Non-cash charges consisted primarily of $11.4 million in goodwill impairment, $4.0 million in stock-based compensation, depreciation and amortization expense of $2.3 million, amortization of our right-of-use operating lease asset of $1.8 million, and provision for credit losses of $1.2 million. Net changes in our operating assets and liabilities consisted primarily of a $3.7 million decrease in deferred revenue, a $3.3 million decrease in accounts payable, accrued payroll and accrued liabilities, a $1.8 million increase in inventory, and a $1.3 million increase in accounts receivable, partially offset by a $2.5 million decrease in deposits, prepaid expenses, and other current assets.

During the year ended December 31, 2022, we used $38.7 million of cash in operations, primarily resulting from our net loss of $48.5 million, partially offset by non-cash charges of $8.0 million and changes in our operating assets and liabilities of $1.8 million. Non-cash charges consisted primarily of $3.7 million in stock-based compensation, depreciation and amortization expense of $1.7 million, amortization of our right-of-use operating lease asset of $1.2 million, the loss on debt extinguishment of $0.7 million, and provision for credit losses of $0.3 million. Net changes in our operating assets and liabilities consisted primarily of a $3.7 million increase in deferred revenue and a $1.2 million increase in accounts payable, accrued payroll and accrued liabilities, partially offset by a $2.5 million increase in accounts receivable and changes in operating lease liabilities of $1.4 million.

Investing Activities

During the year ended December 31, 2023, net cash used in investing activities was $5.7 million, consisting primarily of $33.8 million of purchases of short-term investments and $2.0 million of purchases of property and equipment, partially offset by $30.0 million of maturities and sales of short-term investments.

During the year ended December 31, 2022, net cash used in investing activities was $18.0 million, consisting primarily of $77.4 million of purchases of short-term investments and $4.5 million of purchases of property and equipment, partially offset by $64.4 million of maturities of short-term investments.

Financing Activities

During the year ended December 31, 2023, net cash provided by financing activities was $11.6 million, consisting primarily of gross proceeds of $28.0 million from the sale of Redeemable Convertible Preferred Stock and warrants, offset by $15.0 million of principal repayments under the 2022 Term Loan Agreement, stock issuance costs of $1.6 million, and $0.2 million received from the exercise of stock options and issuance of common shares pursuant to the ESPP.

During the year ended December 31, 2022, net cash provided by financing activities was $4.5 million, consisting primarily of borrowings of $19.8 million from the issuance of debt under the 2022 Term Loan Agreement and $0.6 million received from the exercise of stock options and issuance of common shares pursuant to the ESPP, partially offset by $15.7 million related to the repayment and extinguishment of debt from the 2021 Loan Agreement.

2021 Loan Agreement

On March 4, 2021, we entered into a Loan and Security Agreement with Silicon Valley Bank (SVB) as the lender (the 2021 Loan Agreement). Under the 2021 Loan Agreement, on March 5, 2021, we borrowed a $15.0 million senior secured term loan, the proceeds of which were used to repay all of our existing obligations under the 2019 Loan Agreement, with the remaining proceeds available for our working capital and general corporate purposes. Under the 2021 Loan Agreement, we had the option to elect to obtain a second term loan from SVB in a principal amount up to but not exceeding $5.0 million, provided certain revenue milestones are achieved. The 2021 Loan Agreement was terminated in August 2022 and was fully repaid.

In connection with the 2021 Loan Agreement, we issued to SVB a warrant to purchase a number of shares of preferred stock (the Preferred Warrant). The Preferred Warrant was exercisable into the number of preferred shares equal to approximately $0.2 million divided by the applicable warrant price. The Preferred Warrant was initially exercisable for Series A-1 convertible preferred stock at an exercise price of $3.61 per share. The Preferred Warrant also provided for the grant of additional shares upon the disbursement of an advance under the 2021 Loan Agreement. Such additional shares would be equal to 1.5% of the principal amount of the advance divided by the warrant price. The Preferred Warrant was exercisable at the original purchase price of the Series A-1 convertible preferred stock. When all outstanding shares of our Series A-1 convertible preferred stock were converted into common stock, the warrant became exercisable for such number of shares of common stock into which the preferred shares would have been converted if the warrant had been exercised prior to the conversion. The Preferred Warrant was able to be exercised at any time, in

whole or in part prior to the warrant expiration date of March 4, 2031. The Preferred Warrant was exercised in June 2021 in exchange for 51,409 shares of common stock.

The term loans bore interest at a per annum rate equal to the greater of (a) 4.0% above the prime rate and (b) 7.25%. The term loans were secured by substantially all of our assets, other than our intellectual property. We agreed not to encumber our intellectual property assets, except as permitted by the 2021 Loan Agreement.

A final payment (the Final Payment) equal to $0.4 million was due at the earlier of the maturity date, acceleration of the loans, or a voluntary or mandatory prepayment of the loans. The Final Payment was being accrued through interest expense using the effective interest method.

The 2021 Loan Agreement also included customary indemnification obligations and customary events of default, including, among other things, payment defaults, breaches of covenants following any applicable cure period, material misrepresentations, a failure of the loans or the lender's security interest in the collateral to have the priority as required under the 2021 Loan Agreement, a material adverse change as defined in the 2021 Loan Agreement (including without limitation as a result of a government approval having been revoked, rescinded, suspended, modified or not renewed), certain material judgments and attachments, and events relating to bankruptcy or insolvency. The 2021 Loan Agreement also contained a cross default provision under which, if a third party (under any agreement) has a right to accelerate indebtedness greater than $0.5 million, we would be in default of the 2021 Loan Agreement. During the continuance of an event of default, SVB could apply a default interest rate of an additional 5% to the outstanding loan balances, and SVB could declare all outstanding obligations immediately due and payable and exercise other rights and remedies as set forth in the 2021 Loan Agreement and related loan documents. Acceleration would result in the payment of all outstanding loans, any default interest charged by the lender, all expenses of the lender and the Final Payment. The 2021 Loan Agreement was repaid in full and terminated in August 2022.

2022 Loan Agreements

On August 9, 2022, we entered into (i) a Credit, Security and Guaranty Agreement with MidCap Financial Trust (the Term Loan), and (ii) a Credit, Security and Guaranty Agreement (the Revolver Loan, and together with the Term Loan, the 2022 Loan Agreements) with MidCap Funding IV Trust (together with MidCap Financial Trust, MidCap). On June 30, 2023, we entered into an Amendment No. 2 to Credit, Security and Guaranty Agreement to both the 2022 Loan Agreements (Amendment No. 2). The impact of Amendment No. 2 was to (i) increase the interest rate on the Term Loan, (ii) increase the interest rate floor on the Term Loan and the Revolver Loan, (iii) increase the exit fee, (iv), reset the prepayment penalty, (v) require the lender's consent for activation of future incremental borrowings under the Term Loan, and (vi) reset the minimum net revenue covenant.

As of September 30, 2023, we were not in compliance with certain minimum revenue covenants of the Term Loan. As a result of this non-compliance, MidCap had the ability to call the balance of the loan, along with a 5.5% exit fee and 3.0% prepayment penalty, amounting to a total repayment obligation of approximately $21.7 million for the Term Loan, plus a $0.3 million prepayment penalty for the Revolver Loan.

On November 24, 2023, we entered into Amendment No. 3 to Credit, Security and Guaranty Agreement to both the 2022 Loan Agreements (Amendment No. 3). The impact of Amendment No. 3 was to (i) repay $15.0 million in November 2023 under the Term Loan and (ii) grant MidCap a warrant to purchase 275,000 shares of our common stock at a price equal to the 10-day volume weighted average price of our common stock immediately prior to the date of any amendment of the Term Loan. In exchange for the Company doing the foregoing, MidCap (i) waived all existing defaults under the 2022 Loan Agreements, (ii) reset revenue covenants under the Term Loan, (iii) waived the prepayment penalty related to the $15.0 million repayment and reduced the prepayment penalty for the remaining outstanding balance under the Term Loan to 1%, (iv) froze any future extensions of credit under the Revolver Loan and (v) reduced the exit fee payable upon complete repayment of amounts left outstanding at the end of term by $350,000, with the remaining $750,000 of exit fees to be payable at maturity.

The Term Loan, as amended, provides for a secured term loan facility in an aggregate principal amount of up to $30.0 million, comprised of (i) a tranche one term loan of up to $20.0 million (Tranche One), (ii) a tranche two term loan of up to $5.0 million (Tranche Two), and (iii) a tranche three term loan of up to $5.0 million (Tranche Three). Tranche Two and Tranche Three require MidCap's consent in order for the Company to draw down those borrowings. The Revolver Loan provides for a secured revolving loan facility in an aggregate principal amount of up to $10.0 million, subject to a borrowing base equal to percentages of eligible accounts receivable and inventory as determined in accordance with its terms. The Term Loan and Revolver Loan mature on August 1, 2027.

Tranche One was fully funded on August 9, 2022, to pay transaction fees incurred in connection with the 2022 Loan Agreements and to repay in full our borrowings under the existing loan facility under the 2021 Loan Agreement with Silicon Valley

Bank, with the remaining amount to be used for general corporate purposes. Subject to certain terms and conditions of the 2022 Term Loan Agreement including lender consent, Tranche Two was available between January 1, 2023, and September 30, 2023, following our achievement of specified milestones relating to minimum net revenues and minimum net cash proceeds from equity financing, but was not exercised. Subject to certain terms and conditions of the Term Loan including lender consent, Tranche Three may become available between September 30, 2024, and March 31, 2025. The proceeds of Tranche Three, if available, may be used for working capital and general corporate purposes.

The Term Loan, as amended, bears interest at a floating rate based on an adjusted term secured overnight financing rate (SOFR) plus 0.1% (subject to a floor of 3.50%) for a one-month interest period, plus a margin of 6.75%. Interest on the Term Loan is payable monthly in arrears on the first day of each month and at maturity. For the year ended December 31, 2023, the effective interest rate on outstanding borrowings was approximately 12.16%. Following an initial interest-only period, beginning on August 1, 2025, the outstanding principal amount of the 2022 Term Loan is repayable in twenty-four equal monthly principal payments, with all remaining outstanding principal, together with all accrued and unpaid interest, due at maturity. The Term Loan may be voluntarily prepaid in full, but not in part, at any time and is also subject to mandatory prepayments with the net proceeds of certain dispositions and casualty events, subject to specified thresholds and reinvestment rights. Prepayments are subject to prepayment premiums of 3.00%, 2.00%, and 1.00% of the amount prepaid for prepayments made during years one, two, and three from the date of Amendment No. 2, respectively. Once repaid, the Term Loan may not be reborrowed. We are also obligated to pay an exit fee equal to 5.5% of the outstanding principal amount of the Term Loan borrowed and other customary fees for a credit facility of this size and type. The exit fee is being accrued through interest expense using the effective interest method.

The terms of the Revolver Loan would allow us to borrow, repay and reborrow on until August 1, 2027, at which time the revolving commitments would terminate and all outstanding revolving loans, together with all accrued and unpaid interest, must be repaid. The proceeds of the Revolver Loan would be used for working capital needs and general corporate purposes. As of December 31, 2023, no amount was outstanding under the Revolver Loan . As of November 24, 2023, MidCap froze any future extensions of credit under the Revolver Loan due to the event of default discussed above.

The Revolver Loan would bear interest at a floating rated based on an adjusted term SOFR (subject to a floor of 1.50%) for a one-month interest period, plus a margin of 3.00%. Interest on the Revolver Loan would be payable monthly in arrears on the first day of each month and at maturity. Prior to November 24, 2023, we were obligated to pay an unused line fee equal to 0.50% per annum on the unused portion of the available revolving commitments, a fee for failure to maintain a minimum balance under the 2022 Revolving Loan Agreement, and other customary fees for a credit facility of this size and type.

Our obligations and any future guarantors under the 2022 Loan Agreements are secured by liens on substantially all of our assets.

The 2022 Loan Agreements require us to comply with (i) a minimum net revenue covenant and (ii) a minimum cash covenant, which requires certain unrestricted cash to be greater than or equal to $7.0 million at all times.

The 2022 Loan Agreements contain customary affirmative and negative covenants, including covenants limiting the ability of us and our subsidiaries, among other things, to incur debt, grant liens, make distributions, enter certain restrictive agreements, pay or modify subordinated debt, dispose of assets, make investments and acquisitions, enter into certain transactions with affiliates, and undergo certain fundamental changes, in each case, subject to limitations and exceptions set forth in the 2022 Loan Agreements.

The 2022 Loan Agreements contain customary events of default that include, among other things, certain payment defaults, cross defaults to certain other contracts and indebtedness, covenant defaults, inaccuracy of representations and warranties, bankruptcy and insolvency defaults, judgment defaults, change of control defaults, defaults related to the failure to remain registered with the Securities and Exchange Commission and listed for trading on the Nasdaq Stock Market, and a material adverse change default.

Upon the occurrence and during the continuance of an event of default under the 2022 Loan Agreements, the respective administrative agent, if requested by the respective lenders, may, among other things, (i) suspend or terminate commitments, as well as obligations of the relevant administrative agent and lenders, (ii) declare all outstanding obligations under the applicable agreement (including principal and accrued and unpaid interest) immediately due and payable, and (iii) exercise the other rights and remedies provided for under the applicable agreement. The 2022 Loan Agreements provide that, under certain circumstances, a default interest rate will apply on all obligations under such agreement during the existence of an event of default, at a per annum rate equal to 2.0% above the applicable interest rate.

As of December 31, 2023 the Term Loan is classified within non-current liabilities on the consolidated balance sheets.

We bifurcated a derivative liability related to the acceleration clause triggered upon an event of default (contingent put option) under the Term Loan . The contingent put option liability is classified as a derivative liability on the consolidated balance sheet. The estimated fair value of the contingent put option liability was determined by using a risk-neutral valuation model wherein the fair value of the underlying debt facility is estimated, both with and without the presence of the default provisions, holding all other assumptions constant.

Funding Requirements

We expect our expenses to continue to be significant in connection with our ongoing activities, particularly with respect to research and development efforts related to our future products and our efforts to expand sales of current products and to commercialize future products. In addition, we expect to continue to incur costs associated with operating as a public company. The timing and amount of our operating and capital expenditures will depend largely on:

- the cost of developing new products that are commercially viable; and
- the costs of marketing and selling our products globally.

Until such time, if ever, as we can generate substantial product revenue, we expect to finance our operations through a combination of equity offerings, debt financings, collaborations, strategic alliances and marketing, distribution or licensing arrangements. If we are unable to raise additional funds through equity or debt financings or other arrangements when needed, we may be required to delay, limit, reduce or terminate our research, product development or future commercialization efforts, or grant rights to develop and market products that we would otherwise prefer to develop and market ourselves. Our ability to continue as a going concern is dependent upon the ability to raise additional capital. There can be no assurance that such capital will be available in sufficient amounts or on terms acceptable to us. These factors raise substantial doubt about our ability to continue as a going concern. Based upon our current plans, we believe there currently is insufficient financial resources to fund our operations for at least twelve months from the filing date of this Annual Report. See Note 1 to our consolidated financial statements included elsewhere in this Annual Report for additional information.

Contractual Obligations and Commitments

The following table summarizes our commitments to settle contractual obligations at December 31, 2023:

	Payments Due by Period				
	Total	Less than 1 Year	1 to 3 Years	4 to 5 Years	More than 5 Years
			(in thousands)		
Operating lease commitments [1]	$ 44,339	$ 4,407	$ 9,196	$ 9,141	$ 21,595
Finance lease commitments [2]	287	131	156	—	—
Debt obligations [3]	7,374	620	4,486	2,268	—
Total	$ 52,000	$ 5,158	$ 13,838	$ 11,409	$ 21,595

(1) Consists of payments due for our leases of office space and laboratory space in San Diego, California and Durham County, North Carolina that expire between October 2026 and July 2033. Payments under signed leases that have not commenced yet are not included.

(2) Consists of payments due for our leases of equipment that expire in October 2025 and August 2026.

(3) Consists of the contractually required principal and interest payable under the 2022 Term Loan Agreement. For purposes of this table, the interest due under the 2022 Term Loan Agreement was calculated using an assumed interest rate of 12.19% per annum, which was the interest rate in effect as of December 31, 2023 and assumes no borrowings under Tranche Three.

Off-Balance Sheet Arrangements

We did not have during the periods presented, and we do not currently have any, off-balance sheet arrangements, as defined in the rules and regulations of the SEC.

Going Concern

As of December 31, 2023, we had approximately $19.3 million in cash, cash equivalents, restricted cash and short-term investments. In accordance with ASU No. 2014-15 Presentation of Financial Statements – Going Concern (subtopic 205-40), our

management evaluates whether there are conditions or events, considered in the aggregate, that raise substantial doubt about our ability to continue as a going concern within one year after the date that our consolidated financial statements are issued. Based on our evaluation, substantial doubt exists regarding our ability to continue as a going concern for a period of one year from the issuance of our consolidated financial statements.

Cash used in our operating activities is heavily influenced by the timing and structure of new corporate collaborations and BioXp system revenue. While one feature of our business strategy is seeking new corporate collaborations, assuming no new collaborations and no milestone payments from our existing collaborations, we anticipate that cash used in operating activities will increase in the near term. See the table of contractual obligations and commitments above.

Presently, we do not have sufficient cash resources to fund our planned operations, existing debt and contractual commitments and planned capital expenditures through at least the next twelve months from issuance of these financial statements. We may consume available resources more rapidly than currently anticipated, resulting in the need for additional funding. We expect to incur continuing losses and negative cash flows from operations for the foreseeable future.

Depending on whether we enter into additional collaborative agreements in the near term and the extent to which we earn revenues from our collaborative agreements and product sales, we may decide to raise additional capital through a variety of sources in the short-term and in the long-term, including:

- the public equity markets;
- private equity financings;
- collaborative arrangements; and/or
- public or private debt.

There can be no assurance that we will enter into additional collaborative agreements or maintain existing collaborative agreements, will earn collaborative revenues or that additional capital will be available on favorable terms, if at all. If adequate funds are not available, we may be required to significantly reduce or re-focus our operations or to obtain funds through arrangements that may require us to relinquish rights to certain of our products, technologies or potential markets, either of which could have a material adverse effect on our business, financial condition and results of operations. To the extent that additional capital is raised through the sale of equity or convertible debt securities, the issuance of such securities would result in ownership dilution to our existing stockholders (assuming convertible debt securities were converted into shares). These factors raise substantial doubt regarding our ability to continue as a going concern. Our inability to obtain required funding in the near future or our inability to obtain funding on favorable terms will have a material adverse effect on our operations and strategic development plan for future growth. If we cannot successfully raise additional capital and implement our strategic development plan, our liquidity, financial condition and business prospects will be materially and adversely affected, and we may have to cease operations.

As a result of our recurring losses from operations, negative cash flows from operating activities and need to raise additional capital, our independent registered public accounting firm included an explanatory paragraph in its report on our audited consolidated financial statements for the year ended December 31, 2023 expressing substantial doubt as to our ability to continue as a going concern.

Critical Accounting Policies and Significant Judgments and Estimates

This management's discussion and analysis is based on our consolidated financial statements, which have been prepared in accordance with U.S. generally accepted accounting principles. The preparation of our consolidated financial statements and related disclosures requires us to make judgments and estimates that affect the reported amounts of assets and liabilities, the disclosure of contingent assets and liabilities at the date of our consolidated financial statements and the reported amounts of expenses during the reported periods. We base our estimates on historical experience, known trends and events, and various other factors that we believe to be reasonable under the circumstances. Actual results may differ from these estimates under different assumptions or conditions. On an ongoing basis, we evaluate our judgments and estimates in light of changes in circumstances, facts, and experience. The effects of material revisions in estimates, if any, will be reflected in the consolidated financial statements prospectively from the date of change in estimates.

While our significant accounting policies are described in more detail in Note 2 to our audited consolidated financial statements included elsewhere in this Annual Report, we believe that the following accounting policies are those most critical to the judgments and estimates used in the preparation of our consolidated financial statements.

Revenue Recognition

To date, our revenues have consisted primarily of payments received related to product sales and royalty agreements. We adopted the provisions of ASU 2014-09, Revenue from Contracts with Customers (Topic 606), (ASC 606), at inception. Under ASC 606, we recognize revenue when our customers obtain control of the goods, warranty services are delivered or royalties are earned.

Revenue for our product sales is recognized upon delivery to the customer. Revenue related to extended product warranty arrangements is deferred and recognized over time, as services are delivered. To determine the appropriate amount of revenue to be recognized for arrangements determined to be within the scope of ASC 606, we perform the following five steps: (i) identification of the promised goods or services in the contract; (ii) determination of whether the promised goods or services are performance obligations including whether they are distinct in the context of the contract; (iii) measurement of the transaction price, including the assessment of the constraint on variable consideration; (iv) allocation of the transaction price to the performance obligations; and (v) recognition of revenue when, or as we satisfy each performance obligation. As part of the accounting for arrangements under ASC 606, we must use significant judgment to determine: (a) the performance obligations based on the determination under step (ii) above; (b) the transaction price under step (iii) above; and (c) the stand-alone selling price for each performance obligation identified in the contract for the allocation of transaction price in step (iv) above. We also use judgment to determine whether milestones or other variable consideration, except for royalties and sales-based milestones, should be included in the transaction price as described below. The transaction price is allocated to each performance obligation based on the relative stand-alone selling price of each performance obligation in the contract, and we recognize revenue based on those amounts when, or as, the performance obligations under the contract are satisfied.

The stand-alone selling price is the price at which an entity would sell a promised good or service separately to a customer. Management estimates the stand-alone selling price of each of the identified performance obligations in our customer contracts, maximizing the use of observable inputs. Because we have not sold the same goods or services in our contracts separately to any customers on a stand-alone basis and there are no similar observable transactions in the marketplace, we estimate the stand-alone selling price of each performance obligation in our customer arrangements based on our estimate of costs to be incurred to fulfil our obligations associated with the performance, plus a reasonable margin.

We determined that our only contract liability under ASC 606 is deferred revenue. Amounts received prior to revenue recognition are recorded as deferred revenue in the consolidated balance sheets. Amounts expected to be recognized as revenue within the 12 months following the consolidated balance sheet date are classified as deferred revenue, current in the consolidated balance sheets. Amounts not expected to be recognized as revenue within the 12 months following the consolidated balance sheet date are classified as deferred revenue, net of current portion in the consolidated balance sheets. Amounts are recorded as accounts receivable when our right to consideration is unconditional.

Product Revenue, Net

We recognize revenue on product sales to customers when the transfer of control happens, which generally occurs upon shipment. We recognize revenue on installation and training when the service has been rendered. We include a standard one year warranty with our product sales. These standard warranties are accounted for at the time product revenues are recognized. We also offer extended warranty for an additional fee. Revenue related to extended warranty is recognized on a straight-line basis over the term. Product revenues are recorded net of variable consideration, including discounts.

Product Returns

We generally do not accept product returns and have received an insignificant amount of returns to date.

Service Revenue

We recognize service revenue at a point in time when the service has been rendered and control of promised goods and services are transferred to a customer.

Collaboration Revenue

Research collaboration agreements are recognized as the research services are performed.

Royalties and Other Revenue

Royalties and other revenue consist of fees charged for the license of non-exclusive rights of our patents to third parties and grant revenue received from government entities as reimbursement of expenses related to the development and use of synthetic biology tools to develop solutions to address various areas of concern. The royalties revenue is recognized at the same time as the

third parties record the revenue associated with the use of the license. The grant revenue from the contracts is recognized as the services are performed or ratably over the milestone period and typically require the performance of specific activities and timely reporting of results. Associated expenses are recognized when incurred. Revenue and related expenses are presented gross in the consolidated statements of operations and comprehensive loss.

Inventories

Inventories are stated at the lower of cost or net realizable value. Cost is computed using standard cost, which approximates actual cost on a first-in, first-out basis. Net realizable value is evaluated by considering obsolescence, excess levels of inventory, deterioration and other factors. Adjustments to reduce the cost of inventory to its net realizable value, if required, are made for estimated excess, obsolescence or impaired inventory. Excess and obsolete inventory is charged to cost of revenue and a new, lower-cost basis for that inventory is established and subsequent changes in facts and circumstances do not result in the restoration or increase in that newly established cost basis.

Goodwill

We test goodwill for impairment at a reporting unit level on an annual basis, or more frequently if events or changes in circumstances indicate that the carrying amount of a reporting unit's goodwill might be impaired. If the fair value of the reporting unit exceeds the carrying value of its net assets, goodwill is not impaired, and no further testing is required. If the fair value of the reporting unit is less than the carrying value, we measure the amount of impairment loss, if any, as the excess of the carrying value over the fair value of the reporting unit.

Acquired Intangible Assets

Acquired intangible assets consist of rights to technologies and trade names. We engaged third party valuation specialists to assist us with the initial measurement of the fair value of acquired intangible assets. Acquired intangible assets, other than goodwill, are amortized over their estimated useful lives based upon the estimated economic value derived from the related intangible assets.

Stock-Based Compensation

We measure all stock-based awards granted to employees and directors based on their fair value on the date of the grant using the Black-Scholes option-pricing model for options. Compensation expense for those awards is recognized over the requisite service period, which is generally the vesting period of the respective award for the employees and directors.

For stock-based awards granted to non-employees, the measurement date for non-employee awards is the date of the grant. The compensation expense for non-employees is recognized in the same manner as if we had paid cash in exchange for the goods or services, which is generally the vesting period of the award.

We use the straight-line method to record the expense of awards with service-based vesting conditions. As inputs, the Black-Scholes option-pricing model uses the fair value of our common stock and assumptions we make for the volatility of our common stock, the expected term of our common stock options, the risk-free interest rate for a period that approximates the expected term of our common stock options, our expected dividend yield, and an expected forfeiture rate.

Recently Issued Accounting Pronouncements

A description of recently issued accounting pronouncements that may potentially impact our financial position and results of operations is disclosed in Note 2 to our consolidated financial statements appearing in this Annual Report.

Emerging Growth Company Status

In April 2012, the JOBS Act was enacted. Section 107 of the JOBS Act provides that an “emerging growth company,” or an EGC, can take advantage of the extended transition period provided in Section 7(a)(2)(B) of the Securities Act for complying with new or revised accounting standards. Thus, an EGC can delay the adoption of certain accounting standards until those standards would otherwise apply to private companies. We have elected to use the extended transition period for new or revised accounting standards during the period in which we remain an emerging growth company; however, we may adopt certain new or revised accounting standards early.

We will remain an emerging growth company until the earliest to occur of: (i) the last day of the fiscal year in which we have more than $1.235 billion in annual revenue; (ii) the date we qualify as a "large accelerated filer," with at least $700.0 million of equity securities held by non-affiliates; (iii) the date on which we have issued more than $1.0 billion in non-convertible debt securities during the prior three-year period; and (iv) the last day of the fiscal year ending after the fifth anniversary of our initial public offering.

Item 7A. Quantitative and Qualitative Disclosures about Market Risk

We are a smaller reporting company as defined by Item 10 of Regulation S-K and are not required to provide the information otherwise required under this Item.

INDEX TO CONSOLIDATED FINANCIAL STATEMENTS

	Page
Report of Independent Registered Public Accounting Firm (PCAOB ID 100) for the Years Ended December 31, 2023 and 2022	F-2
Consolidated Balance Sheets as of December 31, 2023 and 2022	F-3
Consolidated Statements of Operations and Comprehensive Loss for the Years Ended December 31, 2023 and 2022	F-4
Consolidated Statements of Convertible Preferred Stock and Stockholders' Equity for the Years Ended December 31, 2023 and 2022	F-5
Consolidated Statements of Cash Flows for the Years Ended December 31, 2023 and 2022	F-6
Notes to Consolidated Financial Statements	F-7

Report of Independent Registered Public Accounting Firm

Board of Directors and Shareholders
Telesis Bio Inc.

Opinion on the Consolidated Financial Statements

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

Going Concern

The accompanying consolidated financial statements have been prepared assuming that the Company will continue as a going concern. As discussed in Note 1 to the consolidated financial statements, the Company has incurred losses and negative cash flows from operations every year since inception, and has an accumulated deficit, that raise substantial doubt about its ability to continue as a going concern. Management's plans in regard to these matters are also described in Note 1. The consolidated financial statements do not include any adjustments that might result from the outcome of this uncertainty.

Basis for Opinion

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

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

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

/s/ WithumSmith+Brown, PC

We have served as the Company's auditor since 2020.

San Francisco, California
March 28, 2024

PCAOB ID Number 100

Telesis Bio Inc.
Consolidated Balance Sheets
(In thousands, except share and per share data)

	December 31,	
	2023	**2022**
Assets		
Current assets:		
Cash and cash equivalents	$ 1,570	$ 30,419
Restricted cash	175	175
Short-term investments	17,588	13,159
Accounts receivable, net of allowance for credit losses of $1,287 and $343 at December 31, 2023 and 2022, respectively	5,985	5,851
Inventory, net	4,025	2,200
Prepaid expenses and other current assets	1,008	3,288
Total current assets	30,351	55,092
Property and equipment, net	7,300	6,861
Right-of-use assets	27,220	1,660
Other long-term assets	676	981
Goodwill	3,497	14,886
Other intangible assets, net	1,367	1,882
Total Assets	$ 70,411	$ 81,362
Liabilities, redeemable convertible preferred stock and stockholders' equity		
Current liabilities:		
Accounts payable	$ 3,284	$ 1,295
Accrued employee expenses	2,142	5,858
Finance lease liability, current portion	112	59
Operating lease liability, current portion	1,710	578
Deferred revenue, current portion	338	3,958
Other accrued liabilities	506	1,377
Other current liabilities	92	373
Total current liabilities	8,184	13,498
Finance lease liability, net of current portion	147	30
Operating lease liability, net of current portion	27,142	1,111
Notes payable, net of discount	5,269	19,649
Derivative liabilities	36	367
Deferred revenue, net of current portion	95	142
Total liabilities	40,873	34,797
Commitments and contingencies (Note 15)		
Preferred stock, $0.0001 par value; 5,000,000 shares authorized:		
Redeemable convertible preferred stock, 280,000 and 0 shares issued and outstanding at December 31, 2023 and 2022, respectively; liquidation preference of $29,300 and $0 at December 31, 2023 and 2022, respectively	29,300	—
Stockholders' equity		
Common stock, $0.0001 par value; 100,000,000 shares authorized at December 31, 2023 and 2022, respectively; 30,063,322 and 29,647,091 shares issued and outstanding at December 31, 2023 and 2022, respectively	5	5
Additional paid-in capital	161,698	160,304
Accumulated other comprehensive loss	—	(3)
Accumulated deficit	(161,465)	(113,741)
Total stockholders' equity	238	46,565
Total liabilities, redeemable convertible preferred stock and stockholders' equity	$ 70,411	$ 81,362

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

Telesis Bio Inc.
Consolidated Statements of Operations and Comprehensive Loss
(in thousands, except share and per share data)

	For the Years Ended December 31,	
	2023	**2022**
Revenue:		
Product revenue	$ 9,691	$ 10,913
Service revenue	6,291	7,121
Collaboration revenue	8,690	6,650
Royalties and other revenue	2,837	2,751
Total revenue	27,509	27,435
Cost of revenue	10,559	11,840
Gross profit	16,950	15,595
Operating expenses:		
Research and development	17,496	23,460
Sales and marketing	13,514	16,489
General and administrative	21,090	22,131
Goodwill impairment	11,389	—
Total operating expenses	63,489	62,080
Loss from operations	(46,539)	(46,485)
Other (expense) income, net:		
Interest income	1,743	738
Interest expense	(3,105)	(1,955)
Change in fair value of derivative liabilities	331	8
Loss on extinguishment of debt	—	(727)
Other expense, net	(130)	(26)
Total other expense, net	(1,161)	(1,962)
Loss before provision for income taxes	(47,700)	(48,447)
Provision for income taxes	(24)	(24)
Net loss	(47,724)	(48,471)
Less: redeemable convertible preferred stock dividends	(1,300)	—
Net loss attributable to common stockholders	(49,024)	(48,471)
Net loss per share attributable to common stockholders—basic and diluted	$ (1.64)	$ (1.65)
Weighted average common stock outstanding—basic and diluted	29,849,832	29,463,361
Other comprehensive loss:		
Net loss	$ (47,724)	$ (48,471)
Unrealized gain (loss) on available-for-sale short-term investments	6	(3)
Foreign currency translation loss	(3)	—
Total comprehensive loss	$ (47,721)	$ (48,474)

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

Telesis Bio Inc.
Consolidated Statements of Convertible Preferred Stock and Stockholders' Equity
(in thousands, except share data)

	Redeemable Convertible Preferred Stock		Common Stock		Additional Paid-in Capital	Accumulated Deficit	Accumulated Other Comprehensive Income (Loss)	Total Stockholders' Equity
	Shares	Amount	Shares	Amount				
Balance at December 31, 2021	—	$ —	29,318,578	$ 5	$ 156,049	$ (65,270)	$ —	$ 90,784
Issuance of common stock upon exercise of stock options	—	—	90,678	—	98	—	—	98
Issuance of common stock upon exercise of ESPP	—	—	237,835	—	482	—	—	482
Stock-based compensation expense	—	—	—	—	3,727	—	—	3,727
Unrealized loss on available-for-sale short-term investments	—	—	—	—	—	—	(3)	(3)
Payment of financing costs	—	—	—	—	(52)	—	—	(52)
Net loss	—	—	—	—	—	(48,471)	—	(48,471)
Balance at December 31, 2022	—	$ —	29,647,091	$ 5	$ 160,304	$ (113,741)	$ (3)	$ 46,565
Issuance of common stock upon exercise of stock options	—	—	106,997	—	86	—	—	86
Issuance of common stock upon exercise of ESPP	—	—	187,951	—	154	—	—	154
Issuance of redeemable convertible preferred stock, net of $1.0 million issuance costs	280,000	18,410	—	—	—	—	—	—
Issuance of warrants, net of $0.6 million issuance costs	—	—	—	—	8,007	—	—	8,007
Redeemable convertible preferred stock dividends	—	1,300	—	—	(1,300)	—	—	(1,300)
Accretion of preferred stock	—	9,590	—	—	(9,590)	—	—	(9,590)
Issuance of warrants in connection with notes payable amendment	—	—	—	—	74	—	—	74
Vesting of restricted stock units	—	—	121,283	—	—	—	—	—
Stock-based compensation expense	—	—	—	—	3,963	—	—	3,963
Unrealized gain on available- for-sale short-term investments	—	—	—	—	—	—	6	6
Foreign currency translation loss	—	—	—	—	—	—	(3)	(3)
Net loss	—	—	—	—	—	(47,724)	—	(47,724)
Balance at December 31, 2023	280,000	$ 29,300	30,063,322	$ 5	$ 161,698	$ (161,465)	$ —	$ 238

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

Telesis Bio Inc.
Consolidated Statements of Cash Flows
(in thousands)

	For the Years Ended December 31,	
	2023	**2022**
Cash Flows From Operating Activities:		
Net loss	$ (47,724)	$ (48,471)
Adjustments to reconcile net loss to net cash used in operating activities:		
Depreciation	1,805	1,156
Amortization of intangible assets	515	515
Amortization of debt discount	765	482
Provision for credit losses	1,198	343
Loss on debt extinguishment	—	727
Stock-based compensation	3,963	3,727
Amortization of operating lease right-of-use assets	1,782	1,204
Change in fair value of derivative liabilities	(331)	(8)
Loss on disposal of property and equipment	136	2
Impairment of property and equipment	244	—
Goodwill impairment	11,389	—
Accretion of discount on short-term investments	(643)	(179)
Changes in operating assets and liabilities:		
Accounts receivable	(1,332)	(2,529)
Inventories	(1,825)	168
Deposits, prepaid expenses and other current assets	2,522	685
Accounts payable, accrued payroll and accrued liabilities	(3,285)	1,163
Deferred revenue	(3,667)	3,744
Operating lease liabilities	(179)	(1,444)
Net cash used in operating activities	(34,667)	(38,715)
Cash Flows From Investing Activities:		
Payment of acquisition related costs	—	(556)
Proceeds from maturities of short-term investments	27,999	64,445
Proceeds from sale of short-term investments	1,996	—
Proceeds from disposal of property and equipment	16	—
Purchase of property and equipment	(1,980)	(4,468)
Purchases of short-term investments	(33,775)	(77,428)
Net cash used in investing activities	(5,744)	(18,007)
Cash Flows From Financing Activities:		
Borrowings on notes payable, net	—	19,761
Repayment of notes payable	(15,000)	(15,000)
Debt extinguishment costs	—	(700)
Payments on finance leases	(92)	(79)
Payments of financing costs	—	(52)
Proceeds from the exercise of common stock options	86	98
Proceeds from the issuance of common stock related to ESPP	154	482
Proceeds from the issuance of preferred stock, net of issuance costs	18,410	—
Proceeds from the issuance of warrants, net of issuance costs	8,007	—
Net cash provided by financing activities	11,565	4,510
Effect of exchange rate fluctuations on cash held	(3)	—
Net Decrease In Cash, Cash Equivalents, and Restricted Cash	(28,849)	(52,212)
Cash, cash equivalents, and restricted cash at beginning of year	30,594	82,806
Cash, cash equivalents, and restricted cash at end of year	$ 1,745	$ 30,594
Supplemental Disclosure Of Cash Flow Information:		
Cash paid for interest	$ 2,232	$ 1,379
Cash paid for taxes	$ 24	$ —
Supplemental Non-Cash Investing and Financing Activities:		
Purchases of property and equipment included in accounts payable and accrued expenses	$ 483	$ 148
Redeemable convertible preferred stock dividends	$ 1,300	$ —
Right-of-use-assets obtained in exchange for operating lease liabilities	$ 27,342	$ 583
Equipment obtained in exchange for finance lease liabilities	$ 325	$ 87
Issuance of warrants in connection with notes payable amendment	$ 74	$ —
Extinguishment of put option derivative liability in connection with notes payable	$ —	$ (112)
Issuance of put option derivative liability in connection with notes payable	$ —	$ 379

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

1. ORGANIZATION, OPERATIONS, AND LIQUIDITY

Business

Telesis Bio Inc. (the Company) was incorporated in the state of Delaware in March 2011, as Synthetic Genomics Solution, Inc., a wholly owned subsidiary of Synthetic Genomics, Inc. (SGI). The Company changed its name to SGI-DNA, Inc. (SGI-DNA) in February 2013, to Codex DNA, Inc. in March 2020, and then to Telesis Bio Inc. in November 2022. The Company manufactures and sells laboratory equipment, specifically synthetic biology instruments, reagents and associated products and related services, primarily to pharmaceutical and academic laboratories worldwide.

The Company has two wholly owned subsidiaries:

- SGI-DNA Limited is a United Kingdom company focused on sales and marketing activities.
- EtonBio Inc., a California corporation (“Eton”), is a San Diego-based biotech company specializing in synthetic biology products and services, including DNA sequencing and oligo synthesis, for the global academic research, pharmaceutical, and biotechnology industries. Eton also markets DNA prep services and products such as antibodies, peptides, and metabolism assay kits.

Going Concern

Since its inception, the Company has devoted substantially all of its efforts to raising capital, commercializing its current products, and developing new product offerings. The Company is subject to a number of risks similar to those of other companies conducting high-risk, early-stage research and development of products. Principal among these risks are a dependence on key individuals and intellectual property, competition from other products and companies, and the technical risks associated with the successful research, development and manufacturing of its products. The Company’s success is dependent upon its ability to continue to raise additional capital in order to fund ongoing research and development, commercialize its products, generate revenue, meet its obligations, and, ultimately, become profitable.

Products currently under development will require significant additional research and development efforts. These efforts require significant amounts of additional capital, adequate personnel and infrastructure.

Since inception, the Company has incurred cumulative operating losses and negative cash flows from operations. These operating losses and negative cash flows have been financed principally from the issuance of equity securities and debt. In the future, such capital may not be available in sufficient amounts, on terms acceptable to the Company, or at all. Risks to which the Company is exposed include uncertainties related to the ability to achieve revenue-generating products; current and potential competitors with greater financial, technological, production, and marketing resources; dependence on key management personnel; and raising additional capital, as needed.

Under Accounting Standards Update ("ASU”) No. 2014-15, Presentation of Financial Statements—Going Concern (Subtopic 205-40), the Company has the responsibility to evaluate whether conditions and/or events raise substantial doubt about its ability to meet its future financial obligations as they become due within one year after the date that its financial statements are issued. The Company has incurred losses and negative cash flows from operations in each year since its inception. As of December 31, 2023, the Company had an accumulated deficit of $161.5 million. In June 2021, the Company received $112.5 million in net proceeds upon completion of its IPO, and in June 2023 received $26.4 million in net proceeds from the sale of preferred stock and warrants. The Company has also received $8.0 million in upfront payments and $7.5 million in milestone payments under its collaboration with Pfizer Inc. (Note 18). Until such time, if ever, as the Company can generate substantial product revenue and/or collaboration revenue and achieve sustained profitability, the Company expects to finance its cash needs through a combination of equity offerings, collaborations, strategic alliances, licensing arrangements and other sources of funding. However, the Company's existing credit facilities may not be available if the Company fails to meet certain financial covenants under the credit facility. On August 9, 2022, the Company entered into (i) a Credit, Security and Guaranty Agreement (the 2022 Term Loan Agreement), with Company and MidCap Financial Trust, and (ii) a Credit, Security and Guaranty Agreement (Revolving Loan) (the 2022 Revolving Loan Agreement, and together with the 2022 Term Loan Agreement, the 2022 Loan Agreements), with MidCap Funding IV Trust (together with MidCap Financial Trust, MidCap). On August 9, 2022, the Company borrowed $20.0 million under the terms of the 2022 Term Loan Agreement. As of September 30, 2023, the Company was not in compliance with the minimum revenue covenants of the 2022 Term Loan Agreement. As a result of this non-compliance, MidCap required the Company to repay $15.0 million in November 2023 under

the 2022 Term Loan Agreement and the parties subsequently entered into Amendment No. 3. As of December 31, 2023, the Company was in compliance with the covenants under the amended 2022 Loan Agreeements. The Company could seek alternative funding to offset the $15.0 million that was repaid to MidCap in November 2023 and potentially refinance the remaining portion of the 2022 Term Loan; however, the Company may not be able to refinance the remaining 2022 Term Loan or raise cash on terms acceptable to the Company or at all. There can be no assurance that the Company will be successful in obtaining additional funding. Financings, if available, may be on terms that are dilutive to stockholders, and the prices at which new investors would be willing to purchase the Company's securities may be lower than the current price of its common stock. The holders of new securities may also receive rights, preferences or privileges that are senior to those of existing holders of common stock. If additional financing is not available or is not available on acceptable terms, the Company could be forced to delay, limit, reduce or terminate product development or future commercialization efforts or grant rights to develop and market products that the Company would otherwise prefer to develop and market itself. These factors raise substantial doubt about the Company's ability to continue as a going concern. Based upon the Company's current level of expenditures, management believes there currently are insufficient financial resources to fund the Company's operations for at least twelve months from the filing date of this Annual Report. The accompanying consolidated financial statements have been prepared on a going concern basis, which contemplates the realization of assets and satisfaction of liabilities in the ordinary course of business. The consolidated financial statements do not include any adjustments relating to the recoverability and classification of recorded asset amounts or the amounts and classification of liabilities that might result from the outcome of this uncertainty.

2. SUMMARY OF SIGNIFICANT ACCOUNTING POLICIES

Basis of Presentation and Principles of Consolidation

The accompanying consolidated financial statements have been prepared in accordance with the rules and regulations of the Securities and Exchange Commission (SEC) and in conformity with generally accepted accounting principles in the United States of America (U.S. GAAP), and include the accounts of the Company and its wholly owned subsidiaries after the elimination of all significant intercompany accounts and transactions. Any reference in these notes to applicable guidance is meant to refer to the authoritative U.S. GAAP as found in the Accounting Standards Codification (ASC) and as amended by Accounting Standards Updates (ASUs) of the Financial Accounting Standards Board (FASB).

Use of Estimates

The preparation of consolidated financial statements in conformity with U.S. GAAP requires management to make estimates and assumptions that affect the reported amounts of assets and liabilities, disclosure of contingent assets and liabilities at the date of the consolidated financial statements, and the reported amounts of revenues and expenses during the reporting periods presented. Key estimates in the consolidated financial statements include the Company's ability to continue as a going concern, revenue recognition, impairment assessment for goodwill and intangible assets, allowance for credit losses, estimated useful lives of property and equipment, valuation of inventory, accrued expenses, valuation of deferred income tax assets, valuation of derivative liabilities, valuation of preferred stock and warrants, share-based compensation, and accrued warranty are subject to significant estimation. Actual results could differ from those estimates. Making estimates requires management to exercise significant judgment, and it is reasonably possible that management's estimate of the effect of a condition, situation or set of circumstances that existed at the date of the consolidated financial statements could change in the near term due to one of more future confirming events.

Reclassifications

Certain prior year amounts have been reclassified to conform to the current presentation. The Company separately presented interest income and interest expense that had previously been combined as "Interest expense, net" on the consolidated statement of operations and comprehensive loss for the year ended December 31, 2022. The Company also separately presented the provision for credit losses line on the consolidated statement of cash flows, which had previously been combined with the change in accounts receivable. These reclassifications had no impact on net loss or net cash used in operating activities for the year ended December 31, 2022.

Concentrations of Credit Risk and Significant Customers

Financial instruments that potentially subject the Company to concentrations of credit risk consist of cash, cash equivalents, and accounts receivable.

The Company's accounts receivable are derived from revenue earned from customers. The Company does not require collateral on accounts receivable. The Company maintains reserves for estimated potential credit losses. For the year ended December 31, 2023, one customer accounted for 43% of the Company's accounts receivable balance and one customer accounted for 33% of the Company's revenue. For the year ended December 31, 2022, one customer accounted for 10% of the Company's accounts receivable balance and one customer accounted for 24% of the Company's revenue.

The Company has significant cash balances at accredited financial institutions which throughout the year regularly exceed the federally insured limit of $250,000. Any loss incurred or a lack of access to such funds could have a significant adverse impact on the Company's financial condition, results of operations, and cash flows.

Cash and Cash Equivalents

Cash and cash equivalents consist of cash deposited with banks and money market funds. The Company considers all highly liquid investments with an original maturity of 90 days or less at the date of purchase to be cash equivalents. The Company's cash equivalents as of December 31, 2023, are funds held in money market accounts and are measured at fair value on a recurring basis.

Short-term Investments

As of December 31, 2023, short-term investments primarily consisted of commercial paper, U.S. Government securities, and corporate debt securities. The Company classifies its investments in securities as available-for-sale because, for accounting purposes, they are not considered to be either held-to-maturity securities or trading securities. They are not considered to be held-to-maturity securities because the Company does not have the intent to hold those securities to maturity. They are not considered trading securities because they were not acquired with the intent of selling them within hours or days. The Company's investments in securities are classified as current as they are available for use in current operations. Short-term investments are carried at fair value with the unrealized gains and losses included in other comprehensive loss as a component of stockholders' equity until realized. The amortized cost of debt securities is adjusted for amortization of premiums and accretion of discounts to maturity and recorded as interest income. Realized gains and losses are determined using the specific identification method and are included in other expense, net.

The Company regularly reviews its investments for declines in fair value below the amortized cost basis to determine whether the impairment, if any, is due to credit-related or other factors. This review includes the credit worthiness of the security issuers, the severity of the unrealized losses, whether the Company has the intent to sell the securities and whether it is more likely than not that the Company will be required to sell the securities before the recovery of the amortized cost basis. Unrealized gains and losses on available-for-sale debt securities are reported as a component of accumulated comprehensive income (loss), with the exception of unrealized losses believed to be related to credit losses, if any, which are recognized in earnings in the period the impairment occurs. Impairment assessments are made at the individual security level each reporting period. When the fair value of an available-for-sale debt investment is less than its cost at the balance sheet date, a determination is made as to whether the impairment is related to a credit loss and, if it is, the portion of the impairment relating to credit loss is recorded as an allowance through net income. There were no impairments related to credit losses during any of the periods presented.

Restricted Cash

In accordance with ASU 2016-18, Statement of Cash Flows (Topic 230): Restricted Cash, the Company explains the change during the period in the total of cash, cash equivalents and restricted cash, and includes restricted cash with cash and cash equivalents when reconciling the beginning-of-period and end-of-period total amounts shown on the consolidated statements of cash flows.

The following table provides a reconciliation of cash, cash equivalents, and restricted cash reported within the consolidated balance sheet dates that comprise the total of the same such amounts shown in the consolidated statements of cash flows for all years presented herein (in thousands):

	December 31,	
	2023	2022
Cash and cash equivalents	$ 1,570	$ 30,419
Restricted cash	175	175
Total cash, cash equivalents, and restricted cash as shown in the consolidated statements of cash flows	$ 1,745	$ 30,594

Accounts Receivable

Accounts receivable is comprised of amounts due from third-party payors recorded at the invoice amount and does not bear interest. The Company reports accounts receivable net of estimated contractual adjustments and any allowance for credit losses. The Company reviews accounts receivable on an ongoing basis to determine collectability. The Company maintains an allowance for credit losses based on its assessment of the collectability of the amounts owed to the Company by its customers. The Company considers the following in determining the level of allowance required: its customer's payment history, the age of the receivable, the credit quality of its customers, the general financial condition of its customer base and other factors that may affect the customers' ability to pay. The Company writes off accounts against the allowance for credit losses when they are deemed to be uncollectible. Net accounts receivable amounted to $6.0 million and $5.9 million as of December 31, 2023 and 2022, respectively. Net accounts receivable include an allowance for credit losses of $1.3 million and $0.3 million as of December 31, 2023 and 2022, respectively, for those accounts deemed uncollectible by the Company.

The allowance for credit losses consists of the following activity (in thousands):

Allowance for credit losses at December 31, 2021	$	—
Provision for credit losses		343
Allowance for credit losses at December 31, 2022		343
Provision for credit losses		1,198
Write-offs		(254)
Allowance for credit losses at December 31, 2023	$	1,287

Inventory

Inventory, which primarily consists of raw materials, labor and overhead related to work in process and sub-assemblies, is stated at the lower of cost or net realizable value. Cost is computed using standard cost, which approximates actual cost on a first-in, first-out basis. Net realizable value is evaluated by considering obsolescence, excessive levels of inventory, deterioration and other factors. Adjustments to reduce the cost of inventory to its net realizable value, if required, are made for estimated excess, obsolete or impaired inventory. Excess and obsolete inventory is charged to cost of revenue and a new, lower-cost basis for that inventory is established and subsequent changes in facts and circumstances do not result in the restoration of amounts previously written off.

Property and Equipment

Property and equipment are recorded at cost, net of accumulated depreciation and amortization. The Company depreciates property and equipment using the straight-line method over estimated useful lives ranging from three to five years. Leasehold improvements and equipment held under capital leases are amortized on a straight-line basis over the shorter of the lease term or the estimated life of the asset.

Upon the sale or retirement of assets, the cost and related accumulated depreciation and amortization are removed from the balance sheet and the resulting gain or loss is reflected in other expense, net in the consolidated statements of operations and comprehensive loss. Maintenance and repairs are charged to the general and administrative expenses in the consolidated statements of operations and comprehensive loss as incurred.

Intangible Assets

The Company has intangible assets and goodwill recorded in connection with its acquisition in March 2019, as well as from the Eton acquisition. Intangible assets are recognized apart from goodwill if they arise from contractual or other legal rights or if they are separable. An asset is considered separable if (a) it is capable of being separated from the acquired entity and sold, transferred, licensed, rented or exchanged, or (b) it can be conveyed in combination with a related asset or liability. Those assets that do not meet either criterion are included in goodwill for financial reporting purposes.

Intangible assets are amortized over their estimated useful lives based upon the estimated economic value derived from the related intangible asset. Intangible assets are reviewed for impairment whenever events or changes in circumstances, such as service discontinuance, technological obsolescence, or significant decreases in the Company's market capitalization indicate that the carrying amount of the asset may not be recoverable. When such events occur, the Company compares the carrying amount of the asset to the undiscounted expected future cash flows related to the asset. If this comparison indicates that an impairment is present, the amount of the impairment is calculated as the difference between the carrying amount and the fair value of the asset. There was no impairment recorded for the years ended December 31, 2023 and 2022.

Goodwill

The Company recognizes the excess of the purchase price over the fair value of identifiable net assets acquired as goodwill. Goodwill is not amortized but is tested for impairment at a reporting unit level annually or more frequently if events or changes in circumstances indicate that the carrying amount of a reporting unit's goodwill may not be recoverable. The Company's reporting units are the financial components of operating segments which constitute businesses for which discrete financial information is available and regularly reviewed by segment management. The Company currently has two reporting units: Telesis Bio and Eton.

The Company's goodwill impairment analysis first assesses qualitative factors to determine whether events or circumstances existed that would lead the Company to conclude it is more likely than not that the fair value of the reporting unit is below its carrying amount. If the Company determines that it is more likely than not that the fair value of the reporting unit is below the carrying amount, a quantitative goodwill assessment is required. In the quantitative evaluation, the fair value of the reporting unit is determined and compared to the carrying value. If the fair value is greater than the carrying value, then the carrying value is deemed to be recoverable and no further action is required. If the fair value estimate is less than the carrying value, goodwill is considered impaired for the amount by which the carrying value exceeds the reporting unit's fair value and a charge would be recognized as impairment of goodwill in the consolidated statements of operations and comprehensive loss. See Note 7 for more information on the Company's goodwill impairment tests as of December 31, 2023 and 2022.

Accounting for Long-Lived Assets

The Company reviews its long-lived assets for impairment whenever events or changes in circumstances indicate that the carrying amount of an asset may not be recoverable. Recoverability of an asset to be held and used is measured by a comparison of the carrying amount of an asset or asset group to the future undiscounted cash flows expected to be generated by the asset or asset group. Impairment expense totaled $0.2 million and $0 for the years ended December 31, 2023 and 2022, respectively.

Leases

ASC Topic 842, "Leases" ("ASC 842"), requires lessees to recognize most leases on the balance sheet with a corresponding right-to-use asset ("ROU asset"). ROU assets represent the Company's right to use an underlying asset for the lease term and lease liabilities represent the Company's obligation to make lease payments arising from the lease. The assets and lease liabilities are recognized at the lease commencement date based on the estimated present value of fixed lease payments over the lease term. ROU assets are evaluated for impairment using the long-lived assets impairment guidance.

Leases will be classified as financing or operating, which will drive the expense recognition pattern. The Company elects to exclude short-term leases if and when the Company has them.

The Company leases office and laboratory space, all of which are operating leases (see Note 8). Most leases include the option to renew and the exercise of the renewal options is at the Company's sole discretion. Options to renew a lease are not included in the Company's assessment unless there is reasonable certainty that the Company will renew. In addition, the Company's lease agreements generally do not contain any residual value guarantees or restrictive covenants.

The interest rate implicit in lease contracts is typically not readily determinable. As a result, the Company utilizes its incremental borrowing rate, which reflects the fixed rate at which the Company could borrow on a collateralized basis the amount of the lease payments in the same currency, for a similar term, in a similar economic environment.

For real estate leases, the Company has elected the practical expedient under ASC 842 to account for the lease and non-lease components together for existing classes of underlying assets and allocates the contract consideration to the lease component only. This practical expedient is not elected for manufacturing facilities and equipment embedded in product supply arrangements.

Deferred Financing Costs

The Company capitalizes certain legal and other third-party fees that are directly associated with obtaining access to capital under credit facilities. Deferred financing costs incurred in connection with obtaining access to capital under credit facilities are recorded as a reduction to the carrying amount of the debt and amortized to interest expense using the effective interest method over the repayment term.

Warrants

The Company accounts for issued warrants as either liability or equity in accordance with ASC Topic 480-10, Accounting for Certain Financial Instruments with Characteristics of both Liabilities and Equity ("ASC 480-10"), or ASC Topic 815-40, Accounting for Derivative Financial Instruments Indexed to, and Potentially Settled in, a Company's Own Stock ("ASC 815-40"). Under ASC 480-10, warrants are accounted for as liability if they are mandatorily redeemable and they require settlement in cash or other assets, or if they are for a variable number of shares. If warrants do not meet the criteria to be accounted for as liability under ASC 480-10, the Company considers the requirements of ASC 815-40 to determine whether the warrants should be accounted for as liability or equity. Under ASC 815-40, contracts that may require settlement for cash are accounted for as a liability, regardless of the probability of the occurrence of the triggering event. Warrants accounted for as a liability are measured at fair value on the issuance date and at the end of each reporting period. Any change in the fair value of the warrants after the issuance date is recorded in the consolidated statement of operations and comprehensive loss as a gain or loss. If warrants do not meet the criteria to be accounted for as a liability under ASC 815-40, in order to conclude warrants should be accounted for as equity, the Company assesses whether the warrants are indexed to its common stock and whether the warrants are accounted for as equity under ASC 815-40 or other applicable U.S. GAAP. Warrants that meet the criteria to be accounted for as equity are recorded at fair value on the issuance date with no changes in fair value recognized after the issuance date. Warrants that meet the criteria to be accounted for as equity will be recorded within additional paid-in capital. After all relevant assessments, the Company concludes whether the warrants are accounted for as liability or equity. Refer to Note 12 for information regarding the warrants issued.

Convertible Preferred Stock

In accordance with ASC Topic 480, Distinguishing Liabilities from Equity ("ASC 480"), preferred stock issued with redemption provisions that are outside of the control of the Company or that contains certain redemption rights in a deemed liquidation event is required to be presented outside of stockholders' equity on the face of the balance sheet. The Company's convertible preferred stock contain redemption provisions that require it to be presented outside of stockholders' equity and as such, the Company has presented its convertible preferred stock as temporary equity.

Income Taxes

The Company is a C Corporation for federal income tax purposes. The Company was not profitable during the years ended December 31, 2023 and 2022. Accordingly, no provision for federal income taxes has been presented in the accompanying consolidated statements of operations and comprehensive loss.

The Company accounts for income taxes under the asset and liability method. Under this method, deferred tax assets and liabilities are recognized for the future tax consequences attributed to differences between financial statement carrying amounts of existing assets and liabilities and their respective tax bases, including operating losses and tax credit carryforwards, if applicable. Deferred tax assets and liabilities are measured using the enacted tax rates expected to apply to taxable income in the years in which the differences are expected to be recovered or settled. The effect on deferred tax assets and liabilities of a change in the tax rates is recognized in income in the period that includes the enactment date.

A valuation allowance may be established for carryforwards and other deferred tax assets when it is more likely than not that such deferred tax assets will not be realized. Based on its facts, the Company considered all available evidence, both positive and negative, including historical levels of taxable income, expectations, and risks associated with estimates of future taxable income, and ongoing prudent and feasible tax planning strategies in assessing the need for a valuation allowance. The Company recorded a valuation allowance against the deferred tax asset as the Company believes it is more likely than not that the deferred asset will not be utilized.

The Company recognizes the effect of income tax positions only if those positions are more likely than not to be sustained upon examination, including resolution of any related appeals or litigation processes. A tax position that meets the more likely than not recognition threshold is measured at the largest amount of benefit that is greater than 50% likely of being realized upon ultimate settlement with a taxing authority. Changes in recognition or measurement are reflected in the period in which the change in judgment occurs. The Company records interest related to unrecognized tax benefits in general and administrative expenses. The Company has determined that it has an uncertain tax position as it relates to its state research and development credits for the years ended December 31, 2023 and 2022 (see Note 14).

Share-Based Compensation

For share-based awards granted to employees and directors, the Company estimates the grant-date fair value using the Black-Scholes option-pricing model. Compensation expense for these awards is recognized net of the estimated forfeiture rate, over the requisite service period, which is generally the vesting period of the respective award.

For share-based awards granted to non-employees, the Company adopted ASU 2018-07, Compensation—Stock Compensation (Topic 718), at inception, as discussed below, in which the measurement date for non-employee awards is the date of grant. The compensation expense for non-employees is recognized in the same manner as if the Company had paid cash in exchange for the goods or services, which is generally the vesting period of the award. During the year ended December 31, 2022, the Company applied an estimated forfeiture rate to share-based compensation. Beginning with new awards granted in 2023, the Company accounted for forfeitures as they occurred.

The Company classifies share-based compensation expense in its consolidated statements of operations and comprehensive loss in the same manner in which the award recipient's payroll costs are classified or in which the award recipient's service payments are classified.

Revenue Recognition

The Company recognizes revenues in accordance with ASU 2014-09, Revenue from Contracts with Customers (Topic 606) (ASC 606). To date, revenues have consisted primarily of payments received related to product sales, services, collaboration agreements, and royalty agreements. Under ASC 606, the Company recognizes revenue when customers obtain control of promised goods or services in an amount that reflects the consideration which the Company expects to receive in exchange for those goods or services.

Revenue for product sales is recognized upon delivery to the customer. Revenue related to extended product warranty arrangements is deferred and recognized over time as services are delivered. To determine the appropriate amount of revenue to be recognized for arrangements determined to be within the scope of ASC 606, the Company performs the following five steps: (i) identification of the promised goods or services in the contract; (ii) determination of whether the promised goods or services are performance obligations including whether they are distinct in the context of the contract; (iii) measurement of the transaction price, including the assessment of the constraint on variable consideration; (iv) allocation of the transaction price to the performance obligations; and (v) recognition of revenue when, or as the Company satisfies each performance obligation. As part of the accounting for arrangements under ASC 606, management must use its significant judgment to determine: (a) the performance obligations based on the determination under step (ii) above; (b) the transaction price under step (iii) above; and (c) the stand-alone selling price for each performance obligation identified in the contract for the allocation of transaction price in step (iv) above. Management also uses its judgment to determine whether milestones or other variable consideration, except for royalties and sales-based milestones, should be included in the transaction price as described below. The transaction price is allocated to each performance obligation based on the relative stand-alone selling price of each performance obligation in the contract, and revenue is recognized based on those amounts when, or as, the performance obligations under the contract are satisfied.

The stand-alone selling price is the price at which an entity would sell a promised good or service separately to a customer. Management estimates the stand-alone selling price of each of the identified performance obligations in customer contracts, maximizing the use of observable inputs. Because the Company has not sold the same goods or services in the contracts separately to any customers on a stand-alone basis and there are no similar observable transactions in the marketplace, the Company estimates the stand-alone selling price of each performance obligation in customer arrangements based on estimated costs to be incurred to fulfil obligations associated with the performance, plus a reasonable margin.

Amounts received prior to revenue recognition are recorded as deferred revenue in the consolidated balance sheets. Amounts expected to be recognized as revenue within the twelve months following the balance sheet date are classified as deferred revenue, current portion in the consolidated balance sheets. Amounts not expected to be recognized as revenue within the twelve months following the balance sheet date are classified as other long-term liabilities in the consolidated balance sheets. Amounts are recorded as accounts receivable when the right to consideration is unconditional.

Product Revenue, Net

The Company recognizes revenue on product sales to customers when the transfer of control happens, which generally occurs upon shipment. The Company recognizes revenue on installation and training when the service has been rendered. The Company includes a standard one-year warranty with its product sales. These standard warranties are accounted for at the time product revenues

are recognized. The Company also offers extended warranty for an additional fee. Revenue related to extended warranty is recognized on a straight-line basis over the term. Product revenues are recorded net of variable consideration, including discounts.

Product Returns

The Company does not generally offer customers the ability to return products and has received an immaterial amount of returns to date.

Service Revenue

The Company recognizes service revenue at a point in time when the service has been rendered and control of promised goods and services are transferred to a customer.

Collaboration Revenue

Research collaboration agreements are recognized as the research services are performed. See Note 18 for additional description of collaboration revenue.

Royalties and Other Revenue

Royalties and other revenue consist of fees charged for the license of non-exclusive rights of the Company's patents to third parties and grant revenue received from government entities as reimbursement of expenses related to the development and use of synthetic biology tools to develop solutions to address various areas of concern. The royalties and other revenue are recognized at the same time as the third parties record the revenue associated with the use of the license. The grant revenue from the contracts is recognized as the services are performed or ratably over the milestone period and typically require the performance of specific activities and timely reporting of results. Associated expenses are recognized when incurred. Revenue and related expenses are presented gross in the consolidated statements of operations and comprehensive loss.

Warranties

The Company provides warranty coverage on its systems. Warranty coverage includes providing labor and parts necessary to repair the systems during the warranty period. The standard warranty coverage is twelve months for system sales. In addition, customers may pay for enhanced warranty service or to extend the warranty period to 24 months or longer. Warranty revenue is deferred and recognized over the warranty period as a part of product sales in the consolidated statements of operations and comprehensive loss. The Company charges warranty expenses to cost of revenue in the period the expense is incurred. The changes in deferred revenue for warranties during the years ended December 31, 2023 and 2022 are summarized as follows (in thousands):

Balance at December 31, 2021	$ 355
Warranty revenue deferred	615
Warranty revenue recognized	(571)
Balance at December 31, 2022	399
Warranty revenue deferred	218
Warranty revenue recognized	(317)
Balance at December 31, 2023	$ 300

The deferred revenue for warranties at December 31, 2023 and 2022 is summarized as follows (in thousands):

	December 31,	
	2023	**2022**
Deferred warranty revenue, current portion	$ 205	$ 257
Deferred warranty revenue, net of current portion	95	142
Total deferred warranty revenue	$ 300	$ 399

Shipping and Handling Costs

Shipping and handling costs are included as a component of cost of revenue in the consolidated statements of operations and comprehensive loss.

Fair Value of Assets and Liabilities

In accordance with ASC 820, fair value is defined as the price that would be received to sell an asset or paid to transfer a liability in an orderly transaction between market participants at the measurement date. When determining fair value, the Company considers the principal or most advantageous market in which the Company would transact, and considers assumptions that market participants would use when pricing the asset or liability. The fair value hierarchy distinguishes between (1) market participant assumptions developed based on market data obtained from independent sources (observable inputs) and (2) an entity's own assumptions about market participant assumptions developed based on the best information available in the circumstances (unobservable inputs).

The fair value hierarchy consists of three broad levels, which gives the highest priority to unadjusted quoted prices in active markets for identical assets or liabilities (Level 1) and the lowest priority to unobservable inputs (Level 3). The three levels of the fair value hierarchy as described below:

Level 1–Quoted prices (unadjusted) in active markets for identical assets or liabilities.

Level 2–Directly or indirectly observable inputs as of the reporting date through correlation with market data, including quoted prices for similar assets and liabilities in active markets and quoted prices in markets that are not active. Level 2 also includes assets and liabilities that are valued using models or other pricing methodologies that do not require significant judgment since the input assumption used in the models, such as interest rates and volatility factors, are corroborated by readily observable data from actively quoted markets substantially the full term of the financial instrument.

Level 3–Unobservable inputs that are supported by little or no market data and require the use of significant management judgment. These values are generally determined using pricing models for which the assumptions utilize management's estimates of market participant assumptions.

The Company's contingent put liability is carried at fair value, determined according to Level 3 inputs in the fair value hierarchy described above (see Note 3).The carrying values of the Company's prepaid expenses and other current assets, accounts payable and accrued expenses approximate their fair value principally because of the short-term maturities of these instruments.

Research and Development

Research and development costs, including direct and allocated expenses, are expensed in the period incurred. Research and development costs include payroll and personnel expense, consulting costs, external contract research and development costs, raw materials and allocated overhead such as depreciation and amortization, rent and utilities. Advance payments for goods and services to be used in future research and development activities are recorded as prepaid expenses and are expensed over the service period as the services are provided or when the goods are consumed.

Advertising

The Company expenses the cost of advertising, including promotional expenses, as incurred. Advertising and promotional expenses for the years ended December 31, 2023 and 2022 were $0.7 million and $1.0 million, respectively.

Comprehensive Income (Loss)

Comprehensive income (loss) includes net loss as well as other changes in stockholders' equity that result from transactions and economic events other than those with stockholders. Other comprehensive loss consists of unrealized gains and losses on investments.

Net Loss per Share

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

Basic net loss per share attributable to common stockholders is computed by dividing net loss attributable to common stockholders by the weighted-average number of shares of common stock outstanding for the period. Diluted net loss per share attributable to common stockholders is computed by adjusting net loss attributable to common stockholders to reallocate undistributed earnings based on the potential impact of dilutive securities. Diluted net loss per share attributable to common stockholders is computed by dividing the diluted net loss attributable to common stockholders by the weighted-average number of shares of common stock outstanding for the period, including potential dilutive shares of common stock assuming the dilutive effect of common stock equivalents. For purposes of this calculation, outstanding stock options, unvested restricted common stock, and convertible preferred stock are considered potential dilutive common stock and are excluded from the computation of diluted net loss per share attributable to common stockholders if their effect is anti-dilutive.

The Company's convertible preferred stock contractually entitles the holders of such shares to participate in dividends but do not contractually require the holders of such shares to participate in losses of the Company. Accordingly, in periods in which the Company reports a net loss, such losses are not allocated to such participating securities. In periods in which the Company reports a net loss attributable to common stockholders, diluted net loss per share attributable to common stockholders is the same as basic net loss per share attributable to common stockholders, since dilutive shares of common stock are not assumed to have been issued if their effect is anti-dilutive. The Company reported a net loss attributable to common stockholders for the years ended December 31, 2023 and 2022.

Segments Information

Operating segments are defined as components of an entity for which separate financial information is available and that is regularly reviewed by the chief operating decision maker (CODM), in deciding how to allocate resources to an individual segment and in assessing performance. The Company's CODM is its chief executive officer. The Company has multiple business activities and are managed and held accountable for operations, operating results and plans for levels or components below the consolidated unit level by individual segment managers. However, discrete financial information is not reviewed by CODM as the operating results of the Company are reviewed by the CODM only on a consolidated basis. Accordingly, the Company has one operating segment, and therefore, one reportable segment.

Recently Adopted Accounting Pronouncements

In December 2019, the FASB issued ASU 2019-12, Simplifying the Accounting for Income Taxes. ASU 2019-12 eliminates certain exceptions related to the approach for intra-period tax allocation, the methodology for calculating income taxes in an interim period and the recognition of deferred tax liabilities for outside basis differences. It also clarifies and simplifies other aspects of the accounting for income taxes. This update is effective for entities other than public business entities, including emerging growth companies that elected to defer compliance with new or revised financial accounting standards until a company that is not an issuer is required to comply with such standards, for annual reporting periods beginning after December 15, 2021, and interim periods within annual periods beginning after December 15, 2022. The Company adopted this standard on January 1, 2023. The adoption of ASU 2021-08 did not have a material impact on the Company's consolidated financial statements and related disclosures

In June 2016, the FASB issued ASU 2016-13, Financial Instruments-Credit Losses: Measurement of Credit Losses on Financial Instruments (Topic 326). ASU 2016-13 requires measurement and recognition of expected credit losses for financial assets. In April 2019, the FASB issued clarification to ASU 2016-13 within ASU 2019-04, Codification Improvements to Topic 326, Financial Instruments-Credit Losses, Topic 815, Derivatives and Hedging, and Topic 825, Financial Instruments. This update is effective for entities other than public business entities, including emerging growth companies that elected to defer compliance with new or revised financial accounting standards until a company that is not an issuer is required to comply with such standards, for annual reporting periods beginning after December 15, 2022. The Company adopted this standard on January 1, 2023. The adoption of ASU 2016-13 did not have a material impact on the Company's consolidated financial statements and related disclosures.

In October 2021, the FASB issued ASU 2021-08, Business Combinations (Topic 805): Accounting for Contract Assets and Contract Liabilities from Contracts with Customers. The ASU requires entities to apply Topic 606 to recognize and measure contract assets and contract liabilities in a business combination. The amendments improve comparability after the business combination by providing consistent recognition and measurement guidance for revenue contracts with customers acquired in a business combination and revenue contracts with customers not acquired in a business combination. The ASU is effective for fiscal years, including interim periods within those fiscal years, beginning after December 15, 2022. Entities should apply the amendments prospectively and early adoption is permitted. The Company adopted this standard on January 1, 2023. The adoption of ASU 2021-08 did not have a material impact on the Company's consolidated financial statements and related disclosures.

Recent Accounting Pronouncements Not Yet Adopted

In October 2023, the FASB issued ASU 2023-06, Disclosure Improvements: Codification Amendments in Response to the SEC's Disclosure Update and Simplification Initiative. This standard was issued in response to the SEC's disclosure update and simplification initiative, which affects a variety of topics within the Accounting Standards Codification. The amendments apply to all reporting entities within the scope of the affected topics unless otherwise indicated. The effective date for each amendment will be the date on which the SEC's removal of that related disclosure from Regulation S-X or Regulation S-K becomes effective, with early adoption prohibited. The Company is currently evaluating the impact this guidance will have on its consolidated financial statement disclosures.

In November 2023, the FASB issued ASU 2023-07, Improvements to Reportable Segment Disclosures (Topic 280). This standard requires the Company to disclose significant segment expenses that are regularly provided to the CODM and are included within each reported measure of segment operating results. The standard also requires the Company to disclose the total amount of any other items included in segment operating results, which were not deemed to be significant expenses for separate disclosure, along with a qualitative description of the composition of these other items. In addition, the standard also requires disclosure of the CODM's title and position, as well as detail on how the CODM uses the reported measure of segment operating results to evaluate segment performance and allocate resources. The standard also aligns interim segment reporting disclosure requirements with annual segment reporting disclosure requirements. This guidance is effective for fiscal years beginning after December 15, 2023, and interim periods within fiscal years beginning after December 15, 2024, with early adoption permitted. The Company is currently evaluating the impact this guidance will have on its consolidated financial statement disclosures.

In December 2023, the FASB issued ASU 2023-09, Improvements to Income Tax Disclosures (Topic 740). This standard requires the Company to provide further disaggregated income tax disclosures for specific categories on the effective tax rate reconciliation, as well as additional information about federal, state/local and foreign income taxes. The standard also requires the Company to annually disclose its income taxes paid (net of refunds received), disaggregated by jurisdiction. This guidance is effective for fiscal years beginning after December 15, 2024, with early adoption permitted. The standard is to be applied prospective basis, although optional retrospective application is permitted. The Company is currently evaluating the impact this guidance will have on its consolidated financial statement disclosures.

3. FAIR VALUE MEASUREMENT

The following table summarizes the fair values of the Company's derivative liabilities on the consolidated balance sheets which comprise money market funds, commercial paper, U.S. government securities, and the contingent put liability (in thousands):

	Fair value measurements as of December 31, 2023			
	Level 1	Level 2	Level 3	Total
Assets				
Money market funds	$ 6	$ —	$ —	$ 6
Commercial paper	—	6,407	—	6,407
U.S. Government securities	—	8,943	—	8,943
Corporate debt securities	—	2,238	—	2,238
Total	$ 6	$ 17,588	$ —	$ 17,594
Liabilities				
Contingent put option liability	$ —	$ —	$ 36	$ 36
Total	$ —	$ —	$ 36	$ 36

	Fair value measurements as of December 31, 2022			
	Level 1	Level 2	Level 3	Total
Assets				
Money market funds	$ 26,784	$ —	$ —	$ 26,784
Commercial paper	—	1,737	—	1,737
U.S. Government securities	—	11,422	—	11,422
Total	$ 26,784	$ 13,159	$ —	$ 39,943
Liabilities				
Contingent put option liability	$ —	$ —	$ 367	$ 367
Total	$ —	$ —	$ 367	$ 367

During the year ended December 31, 2023, there were no transfers between Level 1, Level 2 and Level 3.

Contingent Put Option Liability

The contingent put option liability consists of the fair value of the contingent interest feature and acceleration clause (contingent put option) under the 2021 Loan Agreement and the 2022 Term Loan Agreement (see Note 9). The fair value of the contingent put option liability was based on significant inputs not observable in the market, which represent a Level 3 measurement within the fair value hierarchy. The Company's valuation of the contingent put option liability utilized a risk-neutral valuation model wherein the fair value of the underlying debt facility is estimated, both with and without the presence of the default provisions, holding all other assumptions constant. The Company assesses these assumptions and estimates each reporting period as additional information impacting the assumptions are obtained. Changes in the fair value of the contingent put option liability are recognized in other (expense) income, net as part of the change in fair value of derivative liabilities in the consolidated statements of operations and comprehensive loss. The significant inputs not observable in the market consist of the adjusted market rate of debt and the probability of default. As of December 31, 2023 and 2022, the adjusted market rate of debt was 12.48% and 12.58%, respectively, and the probability of default was 45% and 63%, respectively. A significant change in those inputs could cause a significant change in valuation.

The following table provides a roll-forward of the aggregate fair value of the Company's derivative liabilities for which fair value is determined using Level 3 inputs (in thousands):

	Contingent Put Option Liability
Fair value at December 31, 2021	$ 108
Extinguishment of liability	(112)
Issuance of liability	379
Change in fair value	(8)
Fair value at December 31, 2022	367
Change in fair value	(331)
Fair value at December 31, 2023	$ 36

4. INVESTMENTS

The following tables summarize the short-term investments held (in thousands):

	December 31, 2023			
	Amortized Cost	Unrealized Gains	Unrealized Losses	Fair Value
Assets				
Commercial paper	$ 6,407	$ 1	$ (1)	$ 6,407
U.S. Government securities	8,938	6	(1)	8,943
Corporate debt securities	2,237	1	—	2,238
Total	$ 17,582	$ 8	$ (2)	$ 17,588

	December 31, 2022			
	Amortized Cost	Unrealized Gains	Unrealized Losses	Fair Value
Assets				
Commercial paper	$ 1,737	$ —	$ —	$ 1,737
U.S. Government securities	11,425	1	(4)	11,422
Total	$ 13,162	$ 1	$ (4)	$ 13,159

As of December 31, 2023 and 2022, all short-term investments held by the Company had remaining contractual maturities of one year or less.

As of December 31, 2023 and 2022, the Company reviewed its investment portfolio for declines in fair value below the amortized cost basis to determine whether the impairment, if any, is due to credit-related or other factors. In determining whether the decline in fair value of these securities was related to a credit loss, the Company evaluated whether it intended to sell the security and whether it was more likely than not that the Company would be required to sell the security before recovering its amortized cost basis. During the years ended December 31, 2023 and 2022, the Company concluded that there were no impairments related to credit losses for its investments in securities.

5. INVENTORY

Inventories include material, labor and overhead and are stated at the lower of cost (first-in, first-out method) or net realizable value. The components of inventory are as follows as of December 31, 2023 and 2022 (in thousands):

	December 31,	
	2023	2022
Raw materials	$ 2,026	$ 1,044
Work in process and sub-assemblies	1,031	647
Finished goods	968	509
Total	$ 4,025	$ 2,200

The inventory reserve was $0.8 million and $0.5 million at December 31, 2023 and 2022, respectively.

6. PROPERTY AND EQUIPMENT

Property and equipment consisted of the following on December 31, 2023 and 2022 (in thousands):

	December 31,	
	2023	2022
Machinery and equipment	$ 6,527	$ 5,647
Furniture and fixtures	908	64
Computer hardware and software	2,420	1,531
Leasehold improvements	332	58
Construction in progress	586	1,501
Total	10,773	8,801
Less: Accumulated depreciation and amortization	(3,473)	(1,940)
Total property and equipment, net	$ 7,300	$ 6,861

Depreciation expense for the years ended December 31, 2023 and 2022 was $1.8 million and $1.2 million, respectively. During the year ended December 31, 2023, the Company recorded an impairment charge of $0.2 million on property and equipment. There was no impairment recorded in the year ended December 31, 2022.

7. GOODWILL AND OTHER INTANGIBLE ASSETS

Goodwill

In 2019, SGI sold SGI-DNA to GATTACA Mining, LLC. As part of the transaction, the Company acquired its intangible assets with resulting goodwill. The goodwill carries a fair value of approximately $3.5 million. In connection with the Eton acquisition in November 2021, the excess of the purchase price over the fair value of the net identifiable tangible and intangible assets acquired has been assigned to goodwill at a fair value of $11.4 million.

The Company currently has two reporting units: Telesis Bio and Eton. Goodwill is tested quantitatively for impairment at the reporting unit level annually in the fourth quarter, or more frequently when events or changes in circumstances indicate that the asset might be impaired. During the fourth quarter of 2023, the decrease to the Company’s market capitalization, measured as the price of the Company’s common stock multiplied by common shares outstanding, and the early repayment of $15.0 million under the 2022 Term Loan Agreement lead the Company to conclude it was more likely than not that the fair value of one or more reporting units was below its carrying amount. A quantitative goodwill assessment was then performed for both of the Company's reporting units using a combination of techniques, including an income approach and a market-based approach. Based on the results of the quantitative goodwill assessment for the Eton reporting unit, the Company recorded an impairment charge of $11.4 million to reduce that reporting unit's carrying amount of goodwill to zero. Based on the results of the quantitative goodwill assessment for the Telesis Bio reporting unit, there was no impairment to that reporting unit's goodwill balance of $3.5 million as of December 31, 2023. Should the market value of the Company’s common stock decline, additional impairment charges may be recorded in the future. For the year ended December 31, 2022, the Company did not record any impairment of goodwill.

Other Intangible Assets

Other intangible assets acquired in the sale of SGI-DNA to GATTACA Mining, LLC include the rights to technology and the SGI-DNA trade name. The technology was valued at approximately $3.2 million with a seven-year useful life.

Other intangible assets acquired in the Eton acquisition include the Eton trade name, customer relationships and non-competition agreements. The trade name was valued at $0.1 million with a three-year useful life, the customer relationships at $0.4 million with a 15-year useful life and the non-competition agreements at approximately $30,000 with a three-year useful life.

Other intangible assets, net consists of the following (in thousands):

	December 31, 2023		
	Gross Carrying Value	Accumulated Amortization	Net Carrying Value
Intellectual property	$ 3,150	$ (2,175)	$ 975
Trade name	80	(57)	23
Customer relationships	420	(60)	360
Non-competition agreements	30	(21)	9
Total	$ 3,680	$ (2,313)	$ 1,367

	December 31, 2022		
	Gross Carrying Value	Accumulated Amortization	Net Carrying Value
Intellectual property	$ 3,150	$ (1,725)	$ 1,425
Trade name	80	(30)	50
Customer relationships	420	(32)	388
Non-competition agreements	30	(11)	19
Total	$ 3,680	$ (1,798)	$ 1,882

Amortization expense for each of the years ended December 31, 2023 and 2022, was approximately $0.5 million.

The following table summarizes the estimated future amortization expense of the intangible assets as of December 31, 2023 (in thousands):

Years ending December 31,	Amortization of Intangible Assets
2024	$ 510
2025	478
2026	103
2027	28
2028	28
Thereafter	220
Total	$ 1,367

8. LEASES

As of December 31, 2023, the Company had five outstanding leases for office and laboratory space and scientific manufacturing equipment with remaining terms between approximately two and ten years. The Company has also entered into certain short-term leases with a term of one year or less. These leases are not included within the Company's right-of-use assets or lease liabilities due to the Company's election of the practical expedient recognition exemption for short-term leases.

Corporate Headquarters

In September 2021, the Company entered into the Wateridge Pointe lease for future office and laboratory space at 10421 and 10431 Wateridge Circle, San Diego, California, and concurrently signed a second amendment to the operating lease agreement for its corporate headquarters located at 9535 Waples Street, San Diego, California (the Second Amendment). Under the Second Amendment, the lease at 9535 Waples Street terminated upon the occupancy of office and laboratory space at 10431 Wateridge Circle, in March 2023. The Wateridge Pointe lease provides for a tenant improvement allowance for the renovation and build-out of

the spaces up to $185.00 per square foot, or approximately $12.3 million, with an additional allowance of up to $10.00 per square foot, or approximately $0.7 million if properly requested by the Company. The lessor is solely responsible for the management and payment of the tenant improvements and these expenses will be recorded as lessor improvements per ASC 842 guidance. Combined rent for the two buildings under the Wateridge Pointe lease is approximately $3.9 million per year, subject to annual increases of 3%. The Wateridge Pointe lease provides for a 10-year and 3-month term and the Company is entitled to one option to extend the lease term for an additional five years. Occupancy of 10431 Wateridge Circle and the corresponding termination of the lease at 9535 Waples Street occurred in the first quarter of 2023. Occupancy and commencement of the 10421 Wateridge Circle lease occurred in the second quarter of 2023.

Upon the execution of the Second Amendment, which was deemed to be a lease modification, the Company re-evaluated the assumptions made at the original lease commencement date. The Company determined the Second Amendment consists of a single contract under ASC 842. Accordingly, the Company bifurcated the components of the modified lease. Upon execution of the Second Amendment, the Company adjusted the right-of-use asset and lease liability for the reduced term of the 9535 Waples Street lease component. In addition the Company recorded a right-of-use asset and lease liability on the commencement date of the 10421 and 10431 Wateridge Circle lease components (see Note 19).

Equipment

The Company entered into finance lease agreements for equipment in November 2017 (the 2017 Equipment Lease), January 2018 (the 2018 Equipment Lease), in November 2022 (the 2022 Equipment Lease), and in August 2023 (the 2023 Equipment Lease). The terms of the leases commenced when the equipment was delivered and placed into use which occurred in the same months and years as above, respectively, and accordingly the related right-of-use assets and lease liabilities were recognized on the consolidated balance sheets at their respective commencement dates. The 2017 Equipment Lease expired in October 2022 and the 2018 Equipment Lease expired in December 2022. The 2022 Equipment Lease expires in October 2025 and the 2023 Equipment Lease expires in August 2026.

Summary of Lease Cost

The components of lease cost under ASC 842 are as follows (in thousands):

	December 31,	
	2023	2022
Lease costs		
Finance lease cost:		
Amortization of finance lease right-of-use asset	$ 66	$ 79
Interest on finance lease liabilities	14	3
Operating lease costs	4,617	1,366
Variable lease cost	1,102	706
Short term lease cost	445	915
Total lease cost	$ 6,244	$ 3,069

Supplemental disclosure of cash flow information related to leases are as follows (in thousands):

	December 31,	
	2023	2022
Cash paid for amounts included in the measurement of lease liabilities:		
Operating cash flows from operating leases	$ 3,014	$ 1,606
Operating cash flows from finance leases	$ 14	$ 3
Financing cash flows from finance leases	$ 92	$ 79

The weighted-average remaining lease term and discount rate were as follows:

	December 31,	
	2023	2022
Weighted-average remaining lease term		
Finance leases	2.5 years	2.8 years
Operating leases	9.2 years	3.9 years
Weighted-average discount rate		
Finance leases	8.8%	10.0%
Operating leases	9.7%	8.5%

The following table summarizes the minimum lease payments of the Company's operating and finance lease liabilities as of December 31, 2023 (in thousands):

Years Ending December 31,	Operating	Finance
2024	$ 4,407	$ 131
2025	4,539	99
2026	4,657	57
2027	4,659	—
2028	4,482	—
Thereafter	21,595	—
Total future minimum lease payments	44,339	287
Less: imputed interest	(15,487)	(28)
Present value of lease liability	$ 28,852	$ 259
Less: current portion of lease liability	(1,710)	(112)
Non-current portion of lease liability	27,142	147

9. NOTES PAYABLE

Loan and Security Agreement

As of December 31, 2023 and 2022, the notes payable on the consolidated balance sheets pertains to the Credit, Security and Guaranty Agreement with MidCap Financial Trust and consists of the following (in thousands):

	December 31,	
	2023	2022
Principal amount of notes payable	$ 5,000	$ 20,000
Less: Current portion of notes payable	—	—
Notes payable, net of current portion	5,000	20,000
Accrued interest	100	172
Final debt payment liability	750	900
Debt discount and financing costs, net of accretion	(581)	(1,423)
Notes payable, net of discount and current portion	$ 5,269	$ 19,649

2021 Loan Agreement

On March 4, 2021, the Company entered into a Loan and Security Agreement with Silicon Valley Bank (SVB) as the lender (the 2021 Loan Agreement). The 2021 Loan Agreement was terminated in August 2022, and was fully repaid. Under the 2021 Loan Agreement, the Company borrowed a $15.0 million senior secured term loan, the proceeds of which were used to repay all existing obligations under the Company's previously outstanding loan agreement with Oxford Finance LLC, with the remaining proceeds available for working capital and general corporate purposes. Under the 2021 Loan Agreement, the Company had the option to elect to obtain a second term loan from SVB in a principal amount up to but not exceeding $5.0 million, provided certain revenue milestones are achieved.

The term loan bore interest at a per annum rate equal to the greater of (a) 4.0% above the prime rate and (b) 7.25%. The loan was secured by substantially all of the Company's assets, other than intellectual property. The Company agreed not to encumber its intellectual property assets, except as permitted by the 2021 Loan Agreement.

A final payment (the Final Payment) equal to $0.4 million was due at the earlier of the maturity date, acceleration of the loans, or a voluntary or mandatory prepayment of the loan. The Final Payment was accrued through interest expense using the effective interest method.

The Company bifurcated a compound derivative liability related to the contingent interest feature and acceleration clause (contingent put option) under the 2021 Loan Agreement. The contingent put option liability was valued and separately accounted for in the Company's consolidated financial statements. The contingent put option liability was extinguished when the 2021 Loan Agreement was terminated in August 2022 and the loan fully repaid (Note 3) in connection with the Company entering into the 2022 Term Loan Agreement discussed below.

The Company recorded a $0.7 million loss on debt extinguishment in connection with the termination of the 2021 Loan Agreement in August 2022.

2022 Loan Agreements

On August 9, 2022, the Company entered into (i) a Credit, Security and Guaranty Agreement (the 2022 Term Loan Agreement), with MidCap Financial Trust, and (ii) a Credit, Security and Guaranty Agreement (the 2022 Revolving Loan Agreement, and together with the 2022 Term Loan Agreement, the 2022 Loan Agreements), and the extensions of credit thereunder referred to as the 2022 Term Loan and 2022 Revolving Loan, respectively), with MidCap Funding IV Trust (together with MidCap Financial Trust, MidCap). On June 30, 2023, the Company entered into an Amendment No. 2 to Credit, Security and Guaranty Agreement to both the 2022 Term Loan Agreement and the 2022 Revolving Loan Agreement (Amendment No. 2). The impact of Amendment No. 2 was to (i) increase the interest rate on the 2022 Term Loan, (ii) increase the interest rate floor on the 2022 Term Loan and the 2022 Revolving Loan, (iii) increase the exit fee, (iv), reset the prepayment penalty, (v) require the lender's consent for activation of future incremental borrowings under the 2022 Term Loan Agreement, and (vi) reset the minimum net revenue covenant.

As of September 30, 2023, the Company was not in compliance with certain minimum revenue covenants of the 2022 Term Loan Agreement. As a result of this non-compliance, MidCap had the ability to immediately call the balance of the loan, along with a 5.5% exit fee and 3.0% prepayment penalty, amounting to a total repayment obligation of approximately $21.7 million for the 2022 Term Loan, plus a $0.3 million prepayment penalty for the 2022 Revolving Loan.

On November 24, 2023, the Company entered into Amendment No. 3 to Credit, Security and Guaranty Agreement to both the 2022 Term Loan Agreement and the 2022 Revolving Loan Agreement (Amendment No. 3). The impact of Amendment No. 3 was to (i) repay $15.0 million in November 2023 under the 2022 Term Loan Agreement and (ii) grant MidCap a warrant to purchase 275,000 shares of common stock at a price equal to the 10-day volume weighted average price of the Company's common stock immediately prior to the date of Amendment No. 3. In exchange for the Company doing the foregoing, MidCap (i) waived all existing defaults under the 2022 Loan Agreements, (ii) reset revenue covenants under the 2022 Term Loan Agreement, (iii) waived the prepayment penalty related to the $15.0 million repayment and reduced the prepayment penalty for the remaining outstanding balance under the 2022 Term Loan Agreement to 1%, (iv) froze any future extensions of credit under the 2022 Revolving Loan Agreement and (v) reduced the exit fee payable upon complete repayment of amounts left outstanding at the end of term by $350,000, with the remaining $750,000 of exit fees to be payable at maturity.

The 2022 Term Loan Agreement, as amended, provides for a secured term loan facility in an aggregate principal amount of up to $30.0 million, comprised of (i) a tranche one term loan of up to $20.0 million (Tranche One) , (ii) a tranche two term loan of up to $5.0 million (Tranche Two), and (iii) a tranche three term loan of up to $5.0 million (Tranche Three). Tranche Two and Tranche Three require MidCap's consent in order for the Company to draw down the additional borrowings. The 2022 Revolving Loan Agreement provides for a secured revolving loan facility in an aggregate principal amount of up to $10.0 million, subject to a borrowing base equal to percentages of eligible accounts receivable and inventory as determined in accordance with the 2022 Revolving Credit Agreement. The 2022 Term Loan and 2022 Revolving Loan mature on August 1, 2027.

Tranche One was fully funded on August 9, 2022 to pay transaction fees incurred in connection with the 2022 Loan Agreements and to repay in full the Company's borrowings under its existing loan facility under the 2021 Loan Agreement with Silicon Valley Bank, with the remaining amount to be used be for general corporate purposes. Subject to certain terms and conditions of the 2022 Term Loan Agreement including MidCap's consent, Tranche Two was available between January 1, 2023, and September 30, 2023, following the Company's achievement of specified milestones relating to minimum net revenues and minimum net cash proceeds

from equity financing, but was not exercised. Subject to certain terms and conditions of the 2022 Term Loan Agreement including MidCap's consent, Tranche Three may become available between September 30, 2024, and March 31, 2025. The proceeds of Tranche Three, if available, may be used for working capital and general corporate purposes.

The 2022 Term Loan, as amended bears interest at a floating rate based on an adjusted term secured overnight financing rate (SOFR) plus 0.1% (subject to a floor of 3.50%) for a one-month interest period, plus a margin of 6.75%. Interest on the 2022 Term Loan is payable monthly in arrears on the first day of each month and at maturity. For the year ended December 31, 2023, the effective interest rate on outstanding borrowings was approximately 17.02%.

Following an initial interest-only period, beginning on August 1, 2025, the outstanding principal amount of the 2022 Term Loan is repayable in twenty-four equal monthly principal payments, with all remaining outstanding principal, together with all accrued and unpaid interest, due at maturity. The 2022 Term Loan may be voluntarily prepaid in full, but not in part, at any time and are also subject to mandatory prepayments with the net proceeds of certain dispositions and casualty events, subject to specified thresholds and reinvestment rights. Prepayments are subject to prepayment premiums of 3.00%, 2.00%, and 1.00% of the amount prepaid for prepayments made during years one, two, and three from the date of Amendment No. 2, respectively. Once repaid, the 2022 Term Loan may not be reborrowed. The Company is also obligated to pay an exit fee equal to 5.5% of the outstanding principal amount of the 2022 Term Loan borrowed and other customary fees for a credit facility of this size and type. The exit fee is being accrued through interest expense using the effective interest method.

The Company may borrow, repay and reborrow the 2022 Revolving Loan until August 1, 2027, at which time the revolving commitments will terminate and all outstanding revolving loans, together with all accrued and unpaid interest, must be repaid. The proceeds of the 2022 Revolving Loan may be used for working capital needs and general corporate purposes. As of December 31, 2023, no amount of 2022 Revolving Loan was outstanding under the 2022 Revolving Loan Agreement. On November 24, 2023, MidCap froze any future extensions of credit under the 2022 Revolving Loan Agreement due to the event of default discussed above.

The 2022 Revolving Loan would bear interest at a floating rate based on an adjusted term SOFR (subject to a floor of 1.50%) for a one-month interest period, plus a margin of 3.00%. Interest on the 2022 Revolving Loan would be payable monthly in arrears on the first day of each month and at maturity. Prior to November 24, 2023, the Company was obligated to pay an unused line fee equal to 0.50% per annum on the unused portion of the available revolving commitments, a fee for failure to maintain a minimum balance under the 2022 Revolving Loan Agreement, and other customary fees for a credit facility of this size and type.

The obligations of the Company and any future guarantors under the 2022 Loan Agreements are secured by liens on substantially all of the Company's assets.

The 2022 Loan Agreements, as amended, require the Company to comply with (i) a minimum net revenue covenant and (ii) a minimum cash covenant, which requires certain unrestricted cash to be greater than or equal to $7.0 million at all times.

The 2022 Loan Agreements contain customary affirmative and negative covenants, including covenants limiting the ability of the Company and its subsidiaries, among other things, to incur debt, grant liens, make distributions, enter certain restrictive agreements, pay or modify subordinated debt, dispose of assets, make investments and acquisitions, enter into certain transactions with affiliates, and undergo certain fundamental changes, in each case, subject to limitations and exceptions set forth in the 2022 Loan Agreements.

The 2022 Loan Agreements contain customary events of default that include, among other things, certain payment defaults, cross defaults to certain other contracts and indebtedness, covenant defaults, inaccuracy of representations and warranties, bankruptcy and insolvency defaults, judgment defaults, change of control defaults, defaults related to the failure to remain registered with the Securities and Exchange Commission and listed for trading on the Nasdaq Stock Market, and a material adverse change default.

Upon the occurrence and during the continuance of an event of default under the 2022 Loan Agreements, the respective administrative agent, if requested by the respective lenders, may, among other things, (i) suspend or terminate commitments, as well as obligations of the relevant administrative agent and lenders, (ii) declare all outstanding obligations under the applicable agreement (including principal and accrued and unpaid interest) immediately due and payable, and (iii) exercise the other rights and remedies provided for under the applicable agreement. The 2022 Loan Agreements provide that, under certain circumstances, a default interest rate will apply on all obligations under such agreement during the existence of an event of default, at a per annum rate equal to 2.0% above the applicable interest rate.

The Company bifurcated a derivative liability related to the acceleration clause triggered upon an event of default (contingent put option) under the 2022 Term Loan Agreement. The contingent put option liability is classified as a derivative liability on the

consolidated balance sheet. As of December 31, 2023, the estimated fair value of the contingent put option liability was $36 thousand, which was determined by using a risk-neutral valuation model wherein the fair value of the underlying debt facility is estimated, both with and without the presence of the default provisions, holding all other assumptions constant (Note 3).

As of December 31, 2023, the estimated future principal payments due were as follows:

	December 31, 2023
Estimated future principal payments due	
2024	$ —
2025	1,042
2026	2,500
2027	1,458
Total	$ 5,000

10. STOCKHOLDERS' EQUITY

The Company's common stock began trading on the Nasdaq Global Select Market under the ticker symbol "DNAY" on June 18, 2021. The Company has since changed its ticker symbol to "TBIO" in connection with its name change to Telesis Bio Inc. The Company is authorized to issue 100,000,000 shares of common stock and 5,000,000 shares of preferred stock. The par value of common and preferred stock is $0.0001 per share.

11. REDEEMABLE CONVERTIBLE PREFERRED STOCK

Redeemable Convertible Preferred Stock Financing

On May 31, 2023, the Company executed a Redeemable Convertible Preferred Stock and Warrant Purchase Agreement (the Agreement) for the purposes of raising capital in the aggregate amount of up to $28.0 million by the means of issuance of Redeemable Convertible Preferred Stock and Warrants.

On June 1, 2023, the Company filed a Certificate of Designation of Redeemable Convertible Preferred Stock of Telesis Bio (the Certificate of Designation), to set forth the rights, privileges and preferences of the Redeemable Convertible Preferred Stock.

On June 5, 2023, the Company issued 280,000 shares of Redeemable Convertible Preferred Stock warrants to purchase an aggregate of 17,771,761 shares of the Company's comment stock, for a total purchase price of $28.0 million, plus an additional 355,435 warrants to purchase the Company's common stock issued as consideration for advisory services related to the transaction.

Dividends

From and after the issue date of the Redeemable Convertible Preferred Stock, cumulative dividends accrue on the Accrued Value (as defined below) of each share of Redeemable Convertible Preferred Stock at the annual rate of 8%. Dividends on each share of Redeemable Convertible Preferred Stock are cumulative and accrue daily from and after the issue date, but compound on a quarterly basis on the last day of each calendar quarter (the "Quarterly Dividend Date"), whether or not earned or declared, and whether or not there are earnings or profits, surplus or other funds or assets of the Company legally available for the payment of dividends. All such dividends compound and shall be added to the Accrued Value on each Quarterly Dividend Date. No dividends are to be paid in cash unless such dividends are paid pursuant to liquidation of the Company or a conversion or redemption of the Redeemable Convertible Preferred Stock.

In the event that the board of directors declares a dividend payable upon the then outstanding shares of common stock (other than a stock dividend on the common stock payable solely in the form of additional shares of common stock), the holders of the Redeemable Convertible Preferred Stock shall be entitled, in addition to any cumulative dividends to which the Redeemable Convertible Preferred Stock may be entitled, to receive (concurrent with the payment of the dividend to the holders of common stock) the amount of dividends per share of Redeemable Convertible Preferred Stock that would be payable on the number of whole shares of the common stock into which each share of such Redeemable Convertible Preferred Stock held by each holder could be converted, such number to be determined as of the record date for the determination of holders of common stock entitled to receive such dividend.

"Accrued Value" means, with respect to each share of Redeemable Convertible Preferred Stock, the sum, subject to appropriate adjustment in the event of any stock dividend, stock split, combination or other similar recapitalization with respect to the Redeemable Convertible Preferred Stock, of (i) $100.00 plus (ii) on each Quarterly Dividend Date, an additional amount equal to the dollar value of any dividends on a share of Redeemable Convertible Preferred Stock which have accrued on any dividend payment date and have not been previously added to such Accrued Value.

As of December 31, 2023, no dividends have been declared or distributed to any stockholders, and the Company has accrued dividends to date totaled $1.3 million.

Liquidation Preferences

In the event of any voluntary or involuntary liquidation, dissolution or winding up of the Company (each, a "Liquidation Event") or Deemed Liquidation Event (as defined below), the holders of shares of Redeemable Convertible Preferred Stock shall be entitled to be paid, with respect to each share of Redeemable Convertible Preferred Stock then outstanding held by the holder, out of the assets of the Company available for distribution to its stockholders, on a preferred basis prior and in preference to any distribution to the holders of any common stock or any other junior stock of the Company, an amount in cash per share of Redeemable Convertible Preferred Stock equal to (i) in the event of a Deemed Liquidation Event occurring prior to the 24-month anniversary of the issue date, the greater of (x) 200% multiplied by the sum of the Accrued Value plus an amount equal to all accrued or declared and unpaid dividends on the Redeemable Convertible Preferred Stock that have not previously been added to the Accrued Value or (y) such amount per share as would have been payable in respect of the shares of common stock into which such share of Redeemable Convertible Preferred Stock is then convertible, assuming all outstanding shares of Redeemable Convertible Preferred Stock were converted into common stock immediately prior to such Deemed Liquidation Event or (ii) in the event of (A) a Liquidation Event that is not a Deemed Liquidation Event or (B) a Deemed Liquidation Event occurring on or after the 24-month anniversary of the issue date, the greater of (x) the sum of the Accrued Value plus an amount equal to all accrued or declared and unpaid dividends on the Redeemable Convertible Preferred Stock that have not previously been added to the Accrued Value or (y) such amount per share as would have been payable in respect of the shares of common stock into which such share of Redeemable Convertible Preferred Stock is then convertible, assuming all outstanding shares of Redeemable Convertible Preferred Stock were converted into common stock immediately prior to such Liquidation Event or Deemed Liquidation Event, as applicable (the Liquidation Amount). Deemed Liquidation Event means a reorganization, merger or consolidation in which: (A) the Company is a constituent party or (B) a subsidiary of the Company is a constituent party and the Company issues shares of its capital stock pursuant to such reorganization, merger or consolidation, except any such reorganization, merger or consolidation involving the Company or a subsidiary in which the shares of capital stock of the Company outstanding immediately prior to such reorganization, merger or consolidation continue to represent, or are converted into or exchanged for shares of capital stock that represent, immediately following such reorganization, merger or consolidation, a majority, by voting power, of the capital stock of (1) the surviving or resulting corporation or (2) if the surviving or resulting corporation is a wholly owned subsidiary of another corporation immediately following such reorganization, merger or consolidation, the parent corporation of such surviving or resulting corporation.

Rights and Preferences

At any time when shares of Redeemable Convertible Preferred Stock are outstanding, the Company shall not, either directly or indirectly (including through any subsidiary of the Company) by amendment, merger, consolidation, reclassification, reorganization or otherwise, do any of the following without (in addition to any other vote required by law or the Company's Certificate of Incorporation) the written consent or affirmative vote of the holders of a majority of the then outstanding shares of Redeemable Convertible Preferred Stock (or, solely with respect to section (a) below, the holders of 75% of the then outstanding shares of Redeemable Convertible Preferred Stock), given in writing or by vote at a meeting, consenting or voting separately as a class, and any such act taken or transaction entered into without such consent or vote shall be null and void, and of no force or effect:

(a) amend, modify or fail to give effect to the rights of the holders of Redeemable Convertible Preferred Stock;

(b) increase or decrease the number of authorized shares of Redeemable Convertible Preferred Stock;

(c) create or issue any equity securities or securities convertible into equity securities with equal or superior rights, preferences or privileges to those of the Redeemable Convertible Preferred Stock in respect of (i) payment of dividends, or (ii) distribution of assets of the Company upon a Liquidation Event or Deemed Liquidation Event;

(d) other than the issuance of shares of common stock on exercise or conversion of securities outstanding on the issue date, issue any shares of common stock or securities convertible into or exercisable (directly or indirectly) for common stock if at such time (or after giving affect to such issuance) the Company does not have sufficient shares of common stock available out of its authorized but unissued stock, for the purpose of effecting the conversion of the Redeemable Convertible Preferred Stock into common stock (assuming that accrued and unpaid dividends at such time include all dividends that would have accrued on the Redeemable Convertible Preferred Stock for a period of five years from the date thereof) and the exercise and conversion of all other securities convertible or exercisable (directly or indirectly) for common stock;

(e) declare or pay any dividends or distributions on or make redemptions or repurchases of equity securities, except for repurchases from employees, directors, advisors or consultants upon termination pursuant to contractual call rights; or

(f) create any subsidiary that is not majority-owned, either directly or indirectly, by the Company; provided, however, that this restriction shall not apply, in the case of (i) any subsidiary created outside of the United States, solely to the extent that, due to local law or regulatory requirements, the Company is not permitted to legally own such subsidiary or (ii) the creation of any joint venture created in the ordinary course of business for a bona fide business purpose.

Voting

The holder of each share of Redeemable Convertible Preferred Stock is entitled to one vote for each share of common stock into which such Redeemable Convertible Preferred Stock is convertible on the record date for determining stockholders entitled to vote on such matter. With respect to such vote, such holder has full voting rights and powers equal to the voting rights of the holders of common stock.

Conversion

Each share of Redeemable Convertible Preferred Stock is convertible, at the option of the holder, at any time and from time to time, into such number of shares of common stock as is determined by dividing the Accrued Value by the Conversion Price in effect at the time of conversion. The Conversion Price is initially equal to $2.3633 per share. If at any time following the third anniversary of the issue date, the closing sale price of the Company's common stock exceeds 250% of the Conversion Price for 30 consecutive trading days, then the Company has the right to require conversion of the Redeemable Convertible Preferred Stock, in whole or in part, at the then effective conversion rate.

Redemption

On or after the seventh anniversary of the issue date, (i) each holder of Redeemable Convertible Preferred Stock may require the Company to redeem all of such holder's shares of Redeemable Convertible Preferred Stock for cash at a redemption price per share equal to the Accrued Value, and (ii) the Company may redeem, in whole or in part on a pro rata basis from all holders, shares of Redeemable Convertible Preferred Stock for cash at a redemption price per share equal to the Accrued Value.

The Company has classified the Redeemable Convertible Preferred Stock as temporary equity as the shares have certain redemption features that are not solely in the control of the Company. The Redeemable Convertible Preferred Stock is not currently redeemable because the deemed liquidation provision is considered a substantive condition that is contingent on the event and it is not currently probable that it will become redeemable. The Redeemable Convertible Preferred Stock is not currently redeemable through the optional redemption provision because it is considered a substantive condition that is contingent on the passage of time.

The Company classifies Redeemable Convertible Preferred Stock in accordance with ASC 480, Distinguishing Liabilities from Equity, which requires that contingently redeemable securities be classified outside of permanent stockholders' equity.

Accordingly, the Company has classified all shares of Redeemable Convertible Preferred Stock as mezzanine equity in the accompanying financial statements as of December 31, 2023.

Redeemable Convertible Preferred Stock consisted of the following as of December 31, 2023 (in thousands, except share data):

Redeemable Convertible Preferred Stock	Shares Authorized	Shares Outstanding	Price per Share	Net Carrying Value	Liquidation Preference
Redeemable Convertible Preferred Stock	280,000	280,000	$ 100.00	$ 29,300	$ 29,300
Total	280,000	280,000		$ 29,300	$ 29,300

12. WARRANTS

Common Stock Warrants

On June 5, 2023, the Company issued warrants to purchase a total of 5,923,921 shares of common stock to investors in connection with the Agreement described in Note 11 (Short-Term Warrants). Each Short-Term Warrant has an exercise price of $2.5996 per share and has a two-year term from the date of issuance. Each Short-Term Warrant had a grant date fair value of $0.20. The Short-Term Warrants meet the criteria for permanent equity classification.

On June 5, 2023, the Company issued warrants to purchase a total of 11,847,840 shares of common stock to investors in connection with the Agreement described in Note 11 (Long-Term Warrants). Each Long-Term Warrant has an exercise price of $2.5996 per share and has a seven-year term from the date of issuance. Each Long-Term Warrant had a grant date fair value of $0.61. The Long-Term Warrants meet the criteria for permanent equity classification.

On June 5, 2023, the Company issued warrants to purchase a total of 355,435 shares of common stock as consideration for advisory services in connection with the Agreement described in Note 11 (Additional Warrants). Each Additional Warrant has a strike price of $2.9541 per share and has a five-year term from the date of issuance. Each Additional Warrant had a grant date fair value of $0.45. The Additional Warrants meet the criteria for permanent equity classification.

On November 24, 2023, in connection with the 2022 Term Loan, as amended, described in Note 9, the Company issued a warrant to purchase a total of 275,000 shares of common stock (MidCap Warrant). The MidCap Warrant has an exercise price per share equal to the 10-day volume weighted average price of the Company's common stock immediately prior to the date of issuance, and a ten-year term from the date of issuance. The MidCap Warranthad a grant date fair value of $0.40 per share. The MidCap Warrant meets the criteria for permanent equity classification.

As of December 31, 2023, warrants to purchase an aggregate of 18,402,196 shares of common stock were issued and outstanding.

13. STOCK-BASED COMPENSATION

For the years ended December 31, 2023 and 2022, the Company recorded stock-based compensation expense of approximately $4.0 million and $3.7 million, respectively. No income tax benefit was recognized in the accompanying consolidated statements of operations and comprehensive loss for the Company’s equity incentive plan.

The Company’s board of directors approved the adoption of the SGI-DNA, Inc. 2019 Stock Plan (the 2019 Plan) in March 2019. The 2019 Plan permitted the Company to grant options and restriced stock units for up to 5,544,187 shares of the Company's common stock. On March 3, 2021, the Company’s board of directors and stockholders approved the termination of the 2019 Plan and the adoption of the 2021 Equity Incentive Plan (the 2021 Plan). 6,000,000 shares of common stock were reserved for issuance under the 2021 Plan.

In June 2021, the Company established the 2021 Stock Incentive Plan (the 2021 SIP). The 2021 SIP became effective on the effective date of the IPO, at which time the Company ceased granting awards under the 2021 Plan. The 2021 SIP allows the Company’s board of directors or its compensation committee to grant equity-based awards to the Company’s employees, directors and consultants. A total of 3,500,000 shares of common stock were initially reserved for issuance under the 2021 SIP, plus the number of shares (not to exceed 2,459,970 shares) consisting of (i) the shares of common stock that were available for the issuance of awards under the 2021 Plan at the time the 2021 SIP became effective, which ceased to be available for future issuance under the 2021 Plan at such time and (ii) any shares subject to outstanding options or other share awards that were granted under the 2019 Plan and the 2021

Plan that terminate or expire prior to exercise or settlement; are forfeited because of the failure to vest; or are reacquired or withheld (or not issued) to satisfy a tax withholding obligation or the purchase or exercise price. In addition, the number of shares reserved and available for issuance under the 2021 SIP automatically increases beginning on January 1, 2022 and on each January 1 thereafter by the lesser of 15,750,000 shares or 5% of the outstanding number of shares of common stock on the immediately preceding December 31, or such lesser number of shares as determined by the Company's board of directors. As of December 31, 2023, the number of shares of common stock reserved for issuance under the 2021 SIP was 2,279,576.

Stock option activity under the 2019 Plan, the 2021 Plan and the 2021 SIP for the year ended December 31, 2023 is as follows:

	Number of options	Weighted-average exercise price	Weighted-average remaining contractual term (in years)	Aggregate intrinsic value (in thousands)
Balances at December 31, 2022	4,488,555	$ 2.11	8.9	$ 252
Options granted	2,539,609	1.52		
Options exercised	(106,997)	0.81		
Options cancelled	(1,257,526)	1.99		
Balances at December 31, 2023	5,663,641	$ 1.90	8.5	$ 1
Vested and expected to vest at December 31, 2023	5,285,538	$ 1.89	8.5	$ 1
Exercisable at December 31, 2023	1,754,250	$ 2.47	7.5	$ 1

There were 2,539,609 options granted during the year ended December 31, 2023. The weighted average grant date calculated fair value of options granted during the year ended December 31, 2023 was $0.74 per share. The aggregate intrinsic value of options exercised during the years ended December 31, 2023 and 2022 was $0.1 million and $0.4 million, respectively.

The calculated value of option grants during the years ended December 31, 2023 and 2022 was estimated using the Black-Scholes option pricing model with the following weighted average assumptions:

	For the Years Ended December 31,	
	2023	2022
Risk free interest rate	4.3%	2.4%
Expected dividend yield	—%	—%
Expected term	4.1 years	5.1 years
Forfeiture rate	0.5%	20.0%
Expected volatility	58.1%	54.5%

In December 2022, the Company's board of directors approved a one-time repricing of stock option awards that had been granted to date under the 2021 Plan and the 2021 SIP. The repricing modification took effect on December 13, 2022, while awards held by certain executives were modified on December 19, 2022. The repricing impacted all stock option holders with outstanding shares on the respective repricing dates. The original exercise prices of the repriced stock options ranged from $1.59 to $11.75 per share for 4,261,402 options originally granted from March 2021 through November 2022. The option exercise price was reduced to between $1.15 and $1.26 per share. In addition to the repricing, the vesting of all unvested awards held by certain executives was suspended for three months following the December 19, 2022 date of modification, and restarted pursuant to the original applicable vesting schedule on March 19, 2023. There were no changes to the number of shares or the expiration date of the repriced stock options. Incremental stock-based compensation expense resulting from the repricing was $0.8 million, of which $0.3 million was recognized on the date of modification and $0.5 million recognized prospectively over the remaining term of the stock option awards.

The Company has granted restricted stock units with vesting based conditions. Unvested shares of restricted common stock may not be sold or transferred by the holder. They are legally issued and outstanding. These restrictions lapse accordingly to the time-based vesting of each award.

A summary of the restricted stock unit activity during the year ended December 31, 2023 is as follows:

	Restricted Stock Units	Weighted-Average Grant Date Fair Value
Unvested at December 31, 2022	272,601	$ 6.41
Granted	569,669	1.36
Vested	(121,283)	5.05
Cancelled	(131,795)	2.53
Unvested at December 31, 2023	589,192	$ 2.68

Effective in connection with the IPO, the Company established the 2021 Employee Stock Purchase Plan (the ESPP). The maximum number of shares of common stock that may be issued under the ESPP was initially 350,000. Additionally, the number of shares reserved and available for issuance under the ESPP automatically increases each January 1, beginning on January 1, 2022 and each January 1 thereafter, by the lesser of (i) 1,050,000 shares of common stock, (ii) 1% of the total number of shares of common stock outstanding on December 31 of the preceding calendar year, or (iii) such smaller number of shares of common stock as the Company's board of directors may designate. As of December 31, 2023, the number of shares of common stock that may be issued under the ESPP is 513,869.

For the years ended December 31, 2023 and 2022, 187,951 and 237,835 shares of common stock, respectively, have been issued under the ESPP.

The Company recorded stock-based compensation expense in the following award type categories included within the consolidated statements of operations and comprehensive loss as follows (in thousands):

	For the Years Ended December 31,	
	2023	2022
Stock options	$ 3,157	$ 2,954
Restricted stock units	703	349
Employee stock purchase plan	103	424
Total	$ 3,963	$ 3,727

The Company recorded stock-based compensation expense in the following expense categories of its consolidated statements of operations and comprehensive loss as follows (in thousands):

	For the Years Ended December 31,	
	2023	2022
Research and development	$ 808	$ 582
Sales and marketing	398	425
General and administrative	2,757	2,720
Total	$ 3,963	$ 3,727

As of December 31, 2023, total unrecognized stock-based compensation expense related to unvested stock-based awards was $4.9 million, which is expected to be recognized over a weighted average period of 2.1 years.

14. INCOME TAXES

The components of loss before provision for income taxes for the years ended December 31, 2023 and 2022, consist of the following (in thousands):

	For the Years Ended December 31,	
	2023	2022
Domestic	$ (47,778)	$ (48,556)
Foreign	78	109
Total	$ (47,700)	$ (48,447)

The Company had no current or deferred federal and state income tax expense or benefit for the years ended December 31, 2023 and 2022, because the Company generated net operating losses, and currently management does not believe it is more likely than not that the net operating losses will be realized. The Company's non-U.S. tax obligation is primarily for business activities conducted through the United Kingdom subsidiary for which taxes were determined to be immaterial, and accordingly, such amounts were excluded from the following tables.

A reconciliation of the U.S. federal statutory income tax rate to the Company's effective income tax rate is as follows:

	For the Years Ended December 31,	
	2023	2022
Federal statutory income (benefit) tax rate	(21.0)%	(21.0)%
State income taxes, net of federal benefit	(6.4)	—
Change in valuation allowance	26.0	20.6
Permanent items	0.9	0.8
Tax credits	0.6	(0.4)
Effective income tax rate	—%	—%

The components of the Company's deferred tax assets and liabilities at December 31, 2023 and 2022, consisted of (in thousands):

	For the Years Ended December 31,	
	2023	2022
Deferred tax assets:		
Net operating loss carryforwards	$ 28,683	$ 24,847
Research and development tax credit carryforwards	915	1,202
Stock based compensation	705	669
Capitalized research and development costs	8,229	981
Intangibles	2,280	—
Lease liabilities	7,344	411
Accruals and other	991	2,412
	49,147	30,522
Valuation Allowance	(41,840)	(29,447)
Total deferred tax assets	7,307	1,075
Deferred tax liabilities:		
Right-of-use-assets	(6,928)	(403)
Fixed assets	(379)	(93)
Intangibles	—	(579)
Total deferred tax liabilities	(7,307)	(1,075)
Net deferred tax assets	$ —	$ —

The Company has evaluated the positive and negative evidence bearing upon its ability to realize its deferred tax assets, which are composed principally of net operating loss carryforwards. Management has considered the Company's history of cumulative net losses incurred since inception and has concluded that it is more likely than not that the Company will not realize the benefits of its federal and state net deferred tax assets. Accordingly, a full valuation allowance has been established against the net deferred tax assets as of December 31, 2023 and 2022. The Company reevaluates the positive and negative evidence at each reporting period.

The changes in the valuation allowance for deferred tax assets during the years ended December 31, 2023 and 2022, related primarily to the increases in net operating loss carryforwards, research and development tax credits generated and accruals.

The valuation allowance increased by $12.4 million and $12.7 million during the years ended December 31, 2023 and 2022, respectively.

For the tax years beginning on or after January 1, 2022, the Tax Cuts and Jobs Act of 2017 ("TCJA") eliminates the option to currently deduct research and development expenses and requires taxpayers to capitalize and amortize them over five years for research activities performed in the United States and 15 years for research activities performed outside the United States pursuant to IRC Section 174. Although Congress is considering legislation that would repeal or defer this capitalization and amortization requirement, it is not certain that this provision will be repealed or otherwise modified. If the requirement is not repealed or replaced, it will decrease the Company's tax deduction for research and development expense in future years.

As of December 31, 2023 and 2022, the Company had U.S. federal net operating loss carryforwards of $110.2 million and $95.9 million, respectively. The federal net operating loss carryforwards of $1.3 million, generated before January 1, 2018, will begin to expire in 2034 and the other $108.9 million will carryforward indefinitely but are subject to an 80% taxable income limitation. The Company also had federal research and development tax credit carryforwards of approximately $0.7 million which will begin to expire in 2039, if not utilized.

As of December 31, 2023 and 2022, the Company had state net operating loss carryforwards of $87.5 million and $70.1 million, respectively. The state net operating loss carryforwards of $87.5 million will begin to expire in 2036.

The Company also had California research and development tax credit carryforwards of approximately $0.6 million which do not expire.

The utilization of net operating losses and tax credit carryforwards may be subject to an annual limitation as a result of ownership changes that have occurred previously or may occur in the future. Under Sections 382 and 383 of the Internal Revenue Code (the Code), a corporation that undergoes an ownership change may be subject to limitations on its ability to utilize its pre-change net operating losses and other tax attributes otherwise available to offset future taxable income or tax liability. An ownership change is defined as a cumulative change of 50% or more in the ownership positions of certain stockholders during a rolling three-year period. The Company has not completed a formal study to determine if any ownership changes within the meaning of Code Section 382 and 383 have occurred. If such ownership change has occurred, the Company's ability to use its net operating losses or tax credit carryforwards may be restricted, which could require the Company to pay federal or state income taxes earlier than would be required if such limitations were not in effect.

The Company recognizes the financial statements benefit of a tax position only after determining that the relevant tax authority would more likely than not sustain the position following an audit. For tax positions meeting the more likely than not threshold, the amount recognized in the financial statements is the largest benefit that has a greater than 50% likelihood of being realized upon ultimate settlement with the relevant tax authority. The Company's policy is to record interest associated with uncertain tax positions as interest expense and related penalties in general and administrative expenses.

The following table summarizes the reconciliation of the unrecognized tax benefits activity during the years ended December 31, 2023 and 2022 (in thousands):

Balance as of December 31, 2021	$ 338
Increase of unrecognized tax benefits taken in current year	105
Balance as of December 31, 2022	443
Decrease of unrecognized tax benefits taken in prior year	(105)
Balance as of December 31, 2023	$ 338

If the Company is able to recognize these uncertain tax positions, the unrecognized tax benefits would not impact the effective tax rate if the Company applies a full valuation allowance against the deferred tax assets, as provided in the Company's current policy.

The Company had not incurred any material tax interest or penalties as of December 31, 2023. The Company does not anticipate any significant change within 12 months of this reporting date of its uncertain tax positions. The Company is subject to taxation in the United States and various state jurisdictions, and the United Kingdom. There are no ongoing examinations by taxing authorities at this time. The Company's tax years 2014 through 2023 will remain open for examination by the federal and state authorities for three and

four years, respectively, from the date of utilization of any net operating loss credits. The Company's 2022 and 2023 tax years will remain open for examination by the United Kingdom tax authority for one year from the filing deadline.

Deferred income taxes have not been provided for undistributed earnings of the Company's foreign subsidiary because of the Company's intent to reinvest such earnings indefinitely in active foreign operations. As of December 31, 2023, the Company estimates $0.1 million in unremitted earnings that were permanently reinvested in its foreign subsidiary.

15. COMMITMENTS AND CONTINGENCIES

Litigation

The Company may become involved in various claims, suits, and legal proceedings from time to time in the ordinary course of its business. The Company accrues a liability when it believes that it is both probable and the amount of loss can be reasonably estimated. While the outcome of such claims, lawsuits or other proceedings cannot be predicted with certainty, management expects that any liability, to the extent not provided for by insurance or otherwise, will not have a material adverse effect on the Company's consolidated financial position or results of operations.

Codexis Trademark Litigation

In May 2020 Codexis, Inc. (Codexis) filed a complaint against the Company relating to its CODEX DNA name based on Codexis' rights in the CODEX and CODEXIS mark in the U.S. District Court, Northern District of California for federal and common law trademark infringement and unfair competition/false designation (the Complaint). Codexis seeks injunctive relief, including that the Company cease all use of the term CODEX and any other trademark confusingly similar to the marks CODEX and CODEXIS and not apply for registration of or register the CODEX mark or any other mark confusingly similar to the CODEX or CODEXIS marks, transfer to Codexis all domain names and social media accounts/user names that include the term "codex" and pay damages (consisting of Codexis' actual damages, a disgorgement of the Company's profits and punitive damages as permitted by California common law) as well as attorneys' fees and costs. In April 2022, Codexis and the Company reached a mutually agreeable resolution to the Codexis trademark litigation.

Eurofins Pharma Non-Competition/Non-Solicitation Litigation

In October 2018, Eurofins Pharma US Holdings II, Inc. (EPUSH II) and Eurofins DiscoverX Corporation (Eurofins DiscoverX) (collectively, Plaintiffs) filed a complaint against Todd R. Nelson, the Company and Synthetic Genomics, Inc. (the Company's former parent company, and together with Dr. Nelson and SGI-DNA, the Defendants) to enforce non-competition and non-solicitation provisions of an agreement.

The complaint, filed in the Superior Court of California, County of San Diego, charged Dr. Nelson with breach of contract, the Company with tortious interference, and both with unfair competition. The complaint sought permanent injunctive relief, monetary damages and other equitable relief (including restitution) against the Defendants. On April 9, 2021, the Defendants filed a motion for summary judgment, or in the alternative, summary adjudication, with regard to all causes of action. A hearing on this motion was held on June 25, 2021, at which time the court granted the motion in summary judgment on behalf of SGI-DNA and Dr. Nelson on three of the four claims. The court directed the parties back to mediation on the remaining claim but there was no resolution. On June 22, 2022, at the conclusion of a bench trial, the court ruled in favor of the Company and Dr. Nelson on the remaining claim.

Leases

The Company's non-cancelable lease commitments are described in Note 8.

16. NET LOSS PER SHARE

Net loss per share

Basic and diluted net loss per share attributable to common stockholders was calculated as follows (in thousands, except share and per share amounts):

	For the Years Ended December 31,	
	2023	2022
Numerator:		
Net loss	$ (47,724)	$ (48,471)
Less: Redeemable Convertible Preferred Stock Dividends	(1,300)	—
Net loss attributable to common stockholders	$ (49,024)	$ (48,471)
Denominator:		
Weighted average common stock outstanding - basic and diluted	29,849,832	29,463,361
Net loss per share attributable to common stockholders - basic and diluted	$ (1.64)	$ (1.65)

The Company's potential dilutive securities have been excluded from the computation of diluted net loss per share as the effect would be to reduce the net loss per share. Therefore, the weighted-average number of shares of common stock outstanding used to calculate both basic and diluted net loss per share attributable to common stockholders is the same. The Company excluded the following potential shares of common stock from the computation of diluted net loss per share attributable to common stockholders for the periods indicated because including them would have had an anti-dilutive effect:

	For the Years Ended December 31,	
	2023	2022
Stock options to purchase common stock	5,663,641	4,488,555
Restricted stock units that vest into common stock	589,192	272,601
Shares issuable under employee stock purchase plan	63,715	118,520
Warrants to purchase common stock	18,402,196	—
Redeemable Convertible Preferred Stock (as converted to common stock)	12,398,030	—
Total	37,116,774	4,879,676

17. RETIREMENT PLAN

The Company has a retirement saving plan (the 401(k) Plan) that allows participating employees to defer a portion of their annual compensation on a pretax basis. The Company made no contributions to the 401(k) Plan for the years ended December 31, 2023 and 2022.

18. COLLABORATION

In December 2021, the Company entered into a Research Collaboration and License Agreement (Pfizer Agreement) with Pfizer Inc. (Pfizer), pursuant to which the Company agreed to collaborate with Pfizer to further develop the Company's novel enzymatic DNA synthesis technology for Pfizer's use in its research and development of mRNA-based vaccines and biotherapies. The financial terms of the deal include an upfront payment from Pfizer to the Company, along with success-based technical milestone payments that could be earned in the near term. The Company is also eligible to receive additional milestone payments based on the achievement of specified development, regulatory and commercialization goals associated with any products developed from the application of the Company's technology developed and licensed under the agreement.

The Company granted Pfizer a non-exclusive, worldwide license to use the Company's enzymatic DNA synthesis technology for purposes of researching, developing, manufacturing and commercializing pharmaceutical and biopharmaceutical products and a limited-time option to convert such license to exclusive for specific applications.

Under the Pfizer Agreement, Pfizer made an upfront payment of $8.0 million at the time of execution and subsequent milestone payments of $7.5 million. If the Company meets certain additional technical milestones defined in the Pfizer Agreement, the Company will be eligible to receive an additional $2.5 million in near-term milestone payments.

In addition to the upfront payment and technical milestone payments, Pfizer has agreed to make milestone payments to the Company upon the products meeting certain clinical milestones, with each product (other than exclusive products) being eligible for milestone payments up to $20.0 million if it were to meet the applicable clinical milestones and the first exclusive product in each exclusive field being eligible for milestone payments up to $55.0 million if it were to meet the applicable clinical milestones. Pfizer has also agreed to pay the Company up to $60.0 million in sales milestones for products (other than exclusive products) if aggregate net sales of such products meet certain thresholds and up to $180.0 million in sales milestones for exclusive products if aggregate net sales of the exclusive products meet certain thresholds. Provided the Pfizer Agreement remains in place, Pfizer will also pay escalating royalties from a low to mid-fraction of one percent of net sales of all products. Pfizer's obligations to pay royalties with respect to a product within a country will expire after specific criteria including such product no longer being covered by patent rights licensed to Pfizer by the Company in such country. Royalty payments are subject to reduction after the introduction of a biosimilar product in such country by a third party.

The Company assessed the collaboration and license agreement in accordance with ASC 606, Revenue from Contracts with Customers, and concluded that Pfizer is a customer based on the agreement structure. The Company identified a single combined performance obligation under the arrangement for the performance under the research plan, technology transfer between the parties, participation in the Joint Research Committee, research licenses exchanged by the parties and the non-exclusive commercial license. In addition, the Company identified a material right for the option granted to Pfizer to extend the research term by an additional year. The $8.0 million upfront payment represents the transaction price at inception.

The Company determined that the $8.0 million upfront payment represents the entirety of the consideration to be included in the transaction price as of the outset of the arrangement. The potential milestone payments that the Company may have been eligible to receive were initially excluded from the transaction price at the outset of the arrangement because (i) all technical and development milestone payments did not meet the criteria for inclusion using the most-likely amount method and (ii) the Company recognizes as revenue sales-based milestones and royalties when the related sales occur. During the years ended December 31, 2023 and 2022, the Company achieved technical milestones associated with the research plan and recognized revenue associated with the milestone achievements totaling $5.0 million and $2.5 million, respectively. As of December 31, 2023, no other milestones or royalties have been deemed likely to be achieved or have been achieved.

In accordance with ASC 606, the Company allocated the transaction price, comprising the upfront payment of $8.0 million, based on the stand-alone selling price of the combined performance obligation and the material right. Based on management's analysis, the material right was allocated $0.3 million of the transaction price, while the combined performance obligation was allocated $7.7 million of the transaction price.

The $7.7 million of revenue allocated to the combined performance obligation was recognized using the input method based on time elapsed as compared to the research term of 24 months, and the $0.3 million of revenue allocated to the material right was to be recognized over the third year of services performed under the research plan in the event the option to extend the research plan was exercised, or when the option expired in the event the option to extend the research plan was not exercised. During the year ended December 31, 2022, the option expired unexercised, and the $0.3 million was recognized.

During the year ended December 31, 2023, the Company recognized $8.7 million of revenue related to the Pfizer Agreement. As of December 31, 2023, there was no deferred revenue related to the Pfizer Agreement.

19. SUBSEQUENT EVENTS

In January 2024, the Company signed a first amendment to the operating lease agreements for its corporate headquarters located at 10421 and 10431 Wateridge Circle (First Amendment). Under the First Amendment, the landlord shall apply the existing security deposit of $0.4 million toward the base rent for the six-month period January 1 through June 30, 2024, with the $1.5 million balance of the base rent during that period abated. Under the First Amendment, escalating base rent payments will be $0.4 million to $0.5 million per month from July 2024 through July 2033.

Item 9. Changes in and Disagreements With Accountants on Accounting and Financial Disclosures.

None.

Item 9A. Controls and Procedures.

Evaluation of Disclosure Controls and Procedures

Under the supervision and with the participation of our management, including our Principal Executive Officer (PEO), and Principal Financial Officer (PFO), we evaluated the effectiveness of the design and operation of our disclosure controls and procedures pursuant to Rule 13a-15(e) and 15d-15(e) under the Securities Exchange Act of 1934, as amended (the Exchange Act) as of the end of the period covered by this report. Our disclosure controls and procedures are designed to ensure that information required to be disclosed in the reports we file or submit under the Exchange Act is recorded, processed, summarized and reported within the time periods specified in the SEC's rules and forms, and that such information is accumulated and communicated to our management, including the PEO and PFO, to allow timely decisions regarding required disclosures. Any controls and procedures, no matter how well designed and operated, can provide only reasonable assurance of achieving the desired control objective and management necessarily applies its judgment in evaluating the cost-benefit relationship of possible controls and procedures. Based on that evaluation, our PEO and PFO have concluded, as of December 31, 2023, our disclosure controls and procedures were not effective due to the identified material weakness in internal control over financial reporting described below in this Item 9A.

Notwithstanding the conclusion by the principal executive officer and principal financial officer that the disclosure controls and procedures as of December 31, 2023 were not effective and the material weakness identified in internal controls over financial reporting described below, management believes that the consolidated financial statements and related financial information included in this Annual Report on Form 10-K fairly present in all material respects the Company's financial condition, results of operations and cash flows as of the dates presented, and for the periods ended on such dates, in conformity with accounting principles generally accepted in the United States (US GAAP).

Management's Annual 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 internal control system is designed to provide reasonable assurance regarding the preparation and fair presentation of externally-reported consolidated financial statements in accordance with generally accepted accounting principles in the United States (U.S. GAAP). As discussed above, internal control systems, no matter how well designed, have inherent limitations and can provide only reasonable assurance that their objectives have been met.

As of December 31, 2023, our management conducted an evaluation, under the supervision and with the participation of our PEO and PFO, of the effectiveness of our internal control over financial reporting based upon the framework in the Internal Control -Integrated Framework (2013), issued by the Committee of Sponsoring Organizations of the Treadway Commission. Based upon that evaluation, our PEO and PFO concluded that our internal control over financial reporting was not effective as of December 31, 2023 due to the existence of the material weakness described below.

A material weakness is a deficiency, or a combination of deficiencies, in internal control over financial reporting, such that a reasonable possibility exists that a material misstatement of the annual or interim financial statements would not be prevented or detected on a timely basis. Management identified a combination of deficiencies in the Company's internal control over financial reporting that in the aggregate gave rise to a material weakness. The deficiencies primarily related to limited finance, accounting and IT staffing levels not commensurate with the Company's complexity and its financial accounting and reporting requirements. The Company continued to undergo organizational changes in 2023, including multiple reductions in workforce and the resulting decision to operate with very lean finance, accounting and IT departments. Despite the hiring of a new Chief Financial Officer and a Corporate Controller in September 2023 and a Sarbanes-Oxley compliance firm in the fourth quarter of 2023, the timing and ongoing transitions associated with these changes caused the Company to lack the resources to fully monitor and operate its internal controls over financial reporting as of December 31, 2023, resulting in several deficiencies being discovered during its annual auditing process.

Based on the above, the Company did not fully implement components of the COSO framework, including elements of the control environment, risk assessment, control activities, information and communication, and monitoring activities components.

We are an emerging growth company and a non-accelerated filer, and therefore our independent registered public accounting firm has not issued a report on the effectiveness of internal control over financial reporting.

Remediation Activities

Management continues to evaluate the material weakness discussed above, has created a remediation plan that it has already begun implementing and continues to finalize that plan's implementation. For example, as described above, the Company has already hired a new Chief Financial Officer and a Corporate Controller to oversee the Company's controls environment and a Sarbanes-Oxley compliance firm to assist it in implementing additional controls and procedures in its finance, accounting and IT departments. The Company corrected all deficiencies discovered during its annual audit process prior to the filing of this annual report. However, assurance as to when all remediation efforts will be complete cannot be provided and the material weakness cannot be considered remedied until the applicable controls have operated for a sufficient period of time and management has concluded, through testing, that these controls are operating effectively. Management cannot provide assurances that the measures that have been taken to date, and are continuing to be implemented, will be sufficient to remediate the material weakness identified or to avoid potential future material weaknesses.

Inherent Limitations on Effectiveness of Controls

Our management, including our PEO and PFO, does not expect that our disclosure controls and procedures or our internal control over financial reporting will prevent or detect all error and all fraud. A control system, no matter how well designed and operated, can provide only reasonable, not absolute, assurance that the control system's objectives will be met. 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. Further, because of the inherent limitations in all control systems, no evaluation of controls can provide absolute assurance that misstatements due to error or fraud will not occur or that all control issues and instances of fraud, if any, within a 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 simple error or mistake. Controls can also 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 based in part on 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. Projections of any evaluation of controls effectiveness to future periods are subject to risks. Over time, controls may become inadequate because of changes in conditions or deterioration in the degree of compliance with policies or procedures.

Changes in Internal Control over Financial Reporting

Other than with respect to the ongoing remediation efforts described above, there have been no changes in our internal control over financial reporting that occurred during the year ended December 31, 2023 that have materially affected, or are reasonably likely to materially affect, our internal control over financial reporting.

Item 9B. Other Information

Securities Trading Plans of Directors and Executive Officers

During our quarter ended December 31, 2023, none of our officers or directors, as defined in Rule 16a-1(f), informed us of the adoption or termination of a Rule 10b5-1 trading arrangement or non-Rule 10b5-1 trading arrangement, each as defined in Regulation S-K Item 408..

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

None.

Part III

Item 10. Directors, Executive Officers and Corporate Governance

We have adopted a written code of business conduct and ethics that applies to our directors, officers and employees, including our principal executive officer, principal financial officer, principal accounting officer or controller or, persons performing similar functions. The code of business conduct and ethics is available on our website at http://telesisbio.com. We intend to disclose future amendments to such code, or any waivers of its requirements, applicable to any principal executive officer, principal financial officer, principal accounting officer or controller or persons performing similar functions, or our directors on our website identified above or in a Current Report on Form 8-K. Information contained on the website is not incorporated by reference into this Annual Report.

The remaining information required under this item is incorporated herein by reference to our definitive proxy statement (Proxy Statement) pursuant to Regulation 14A under the Securities Exchange Act of 1934, as amended, which Proxy Statement is expected to be filed with Securities and Exchange Commission not later than 120 days after the close of our fiscal year ended December 31, 2023.

Item 11. Executive Compensation

The information required by this item will be set forth in the Proxy Statement and is incorporated herein by reference.

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

The information required by this item will be set forth in the Proxy Statement and is incorporated herein by reference.

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

The information required by this item will be set forth in the Proxy Statement and is incorporated herein by reference.

Item 14. Principal Accounting Fees and Services

The information required by this item will be set forth in the Proxy Statement and is incorporated herein by reference.

Part IV

Item 15. Exhibits, Financial Statement Schedules

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

1. Financial Statements: The financial statements filed as part of this Annual Report are included in Part II, Item 8 of this Annual Report.

2. Financial Statement Schedules: Financial statement schedules have been omitted in this Annual Report because they are not applicable, not required under the instructions or the information requested is set forth in the financial statements or related notes thereto.

3. Exhibits: The list of exhibits filed with this Annual Report is set forth in the Exhibit Index preceding the signature page and is incorporated herein by reference or filed with this Annual Report, in each case as indicated therein (numbered in accordance with Item 601 of Regulation S-K).

Exhibit Number	Description	Form	File No.	Exhibit	Filing Date
2.1	Share Purchase Agreement among Telesis Bio, Inc. and the stockholders of Eton Bioscience Inc. dated November 9, 2021	8-K	001-40497	2.1	11/9/21
3.1	Amended and Restated Certificate of Incorporation of the Registrant.	S-1	333-256644	3.2	5/28/21
3.2	Amended and Restated Bylaws of the Registrant.	S-1	333-256644	3.4	5/28/21
3.3	Certificate of Designation of Redeemable Convertible Preferred Stock	8-K	001-40497	3.1	6/8/23
4.1	Amended and Restated Investors' Rights Agreement by and among the Registrant and certain of its stockholders, dated December 19, 2019.	S-1	333-256644	4.1	5/28/21
4.1.1	Amendment No. 1 to Amended and Restated Investors' Rights Agreement by and among the Registrant and certain of its stockholders, dated May 31, 2023.	8-K	001-40497	10.3	5/31/23
4.2	Specimen common stock certificate of the Registrant.	S-1/A	333-256644	4.2	6/14/21
4.3	Warrant to Purchase Stock issued to Silicon Valley Bank, dated as of March 4, 2021.	S-1	333-256644	4.3	5/28/21
4.4	Form of Short-Term Warrant.	8-K	001-40497	4.1	5/31/23
4.5	Form of Long-Term Warrant.	8-K	001-40497	4.2	5/31/23
4.6	Form of Pre-Funded Common Stock Purchase Warrant.	8-K	001-40497	4.3	5/31/23
4.7	Form of Warrant issued to affiliates of H.C. Wainright & Co., LLC.	8-K	001-40497	4.1	6/9/23
4.8	Form of Registration Rights Agreement by and among the Registrant and certain of its stockholders, dated June 2, 2023.	8-K	001-40497	10.2	5/31/23
4.9	Form of MidCap Warrant.				
4.10	Description of the Registrant's securities registered pursuant to section 12 of the securities exchange act of 1934.	10-K	001-40497	4.4	3/23/22
10.1+	Form of Indemnification Agreement between the Registrant and each of its directors and executive officers.	S-1	333-256644	10.1	5/28/21
10.2+	2019 Stock Plan, as amended, and forms of agreement thereunder.	S-1	333-256644	10.2	5/28/21
10.3+	2021 Equity Incentive Plan, as amended, and forms of agreement thereunder.	S-1	333-256644	10.3+	5/28/21

10.4+	2021 Stock Incentive Plan and forms of agreements thereunder.	S-1/A	333-256644	10.4+	6/14/21
10.5+	2021 Employee Stock Purchase Plan and forms of agreements thereunder.	S-8	333-257191		6/8/21
10.6+	Confirmatory Employment Letter between the Registrant and Todd Nelson dated May 19, 2021.	S-1	333-256644	10.6+	5/28/21
10.7+	Confirmatory Employment Letter between the Registrant and Daniel Gibson dated May 19, 2021.	S-1	333-256644	10.8+	5/28/21
10.8+	Confirmatory Offer Letter between the Registrant and Eric Esser dated May 2, 2022.	8-K	001-40497	10.1	5/02/23
10.9+	Offer Letter between the Registrant and William Kullback dated August 10, 2023.	8-K	001-40497	10.1	8/29/23
10.10+	Executive Incentive Compensation Plan.	S-1	333-256644	10.11+	5/28/21
10.11+	Form of Change in Control Severance Agreement.	S-1	333-256644	10.12+	5/28/21
10.12+	Amended and Restated Director Compensation Policy.				
10.13	Office Lease, dated April 4, 2019, between the Registrant and BMR-Waples LP, as amended.	S-1	333-256644	10.14+	5/28/21
10.14#	Supply Agreement, dated October 26, 2015, between the Registrant and Integrated DNA Technologies, Inc., as amended.	S-1	333-256644	10.15+	5/28/21
10.15#	Loan and Security Agreement, dated March 4, 2021, between the Registrant and Silicon Valley Bank.	S-1	333-256644	10.16+	5/28/21
10.16#	Confidential Settlement Agreement between the Registrant and New England Biolabs, Inc. dated September 20, 2017.	S-1/A	333-256644	10.17#	6/14/21
10.17	Separation and General Release Agreement	10-Q	001-40497	10.2	11/10/21
10.18	Second Amendment to Loan and Security Agreement by and between Registrant and Silicon Valley Bank, dated November 8, 2021	8-K	001-40497	10.1#	11/08/21
10.19#	Research Collaboration and License Agreement by and between Registrant and Pfizer Inc. dated December 20, 2021	10-K	001-40497	10.21#	3/23/22
10.20#	Credit, Security and Guaranty Agreement (Revolving Loan) with MidCap Funding IV Trust and the lenders from time to time party thereto.	10-Q	001-40497	10.1	11/9/22
10.21#	Amendment No. 2 to Credit, Security and Guaranty Agreement (Revolving Loan).	10-Q	001-40497	10.1	8/11/23
10.22#	Credit, Security and Guaranty Agreement (Term Loan) with MidCap Financial Trust and the lenders from time to time party thereto.	10-Q	001-40497	10.2	11/9/22
10.23#	Amendment No. 2 to Credit, Security and Guaranty Agreement (Term Loan).	10-Q	001-40497	10.2	8/11/23
10.24	Amendment No. 3 to Credit, Security and Guaranty Agreement (Term Loan)				
10.25	Amendment No. 3 to Credit, Security and Guaranty Agreement (Revolving Loan)				
21.1	Subsidiaries of the Registrant				
23.1	Consents of Independent Registered Public Accounting Firms.				
31.1	Certification of Principal Executive Officer Pursuant to Rules 13a-14(a) and 15d-14(a) under the Securities Exchange Act of				

	1934, as Adopted Pursuant to Section 302 of the Sarbanes-Oxley Act of 2002.
31.2	Certification of Principal Financial Officer Pursuant to Rules 13a-14(a) and 15d-14(a) under the Securities Exchange Act of 1934, as Adopted Pursuant to Section 302 of the Sarbanes-Oxley Act of 2002.
32.1†	Certifications of Principal Executive Officer Pursuant to 18 U.S.C. Section 1350, as Adopted Pursuant to Section 906 of the Sarbanes-Oxley Act of 2002.
32.2†	Certifications of Principal Financial Officer Pursuant to 18 U.S.C. Section 1350, as Adopted Pursuant to Section 906 of the Sarbanes-Oxley Act of 2002.
101.INS	Inline XBRL Instance Document
101.SCH	Inline XBRL Taxonomy Extension Schema With Embedded Linkbase Documents
104	Cover Page Interactive Data File (formatted as Inline XBRL and contained in Exhibit 101)

+ Indicates management contract or compensatory plan.
# Portions of the exhibit have been omitted as the Registrant has determined that (i) the omitted information is not material; and (ii) the Registrant customarily and actually treats the omitted information as private or confidential.
† The certifications attached as Exhibit 32.1 and Exhibit 32.2 that accompany this Annual Report, are deemed furnished and not filed with the Securities and Exchange Commission and are not to be incorporated by reference into any filing of the Registrant under the Securities Act of 1933, as amended, or the Securities Exchange Act of 1934, as amended, whether made before or after the date of this Annual Report, irrespective of any general incorporation language contained in such filing.

Item 16. Form 10-K Summary

None.

SIGNATURES

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

Date: March 28, 2024

TELESIS BIO, INC.

By: /s/ Todd R. Nelson
Todd R. Nelson
Chief Executive Officer

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

Signature	Title	Date
/s/ Todd R. Nelson Todd R. Nelson	Chief Executive Officer and Director *(Principal Executive Officer)*	March 28, 2024
/s/ William J. Kullback William J. Kullback	Chief Financial Officer *(Principal Financial Officer)*	March 28, 2024
/s/ Andrea L. Jackson Andrea L. Jackson	Director	March 28, 2024
/s/ Jami D. Nachtsheim Jami D. Nachtsheim	Director	March 28, 2024
/s/ Annette Tumolo Annette Tumolo	Director	March 28, 2024
/s/ Greg Herrema Greg Herrema	Director	March 28, 2024
/s/ Christine A. Tsingos Christine A. Tsingos	Director	March 28, 2024
/s/ Frank R. Witney Frank R. Witney	Chair of the Board of Directors	March 28, 2024

[THIS PAGE INTENTIONALLY LEFT BLANK]

[THIS PAGE INTENTIONALLY LEFT BLANK]